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JANUARY 1957

ATIONAL BUSINESS AIRCRAFT ASSOCIATION OFFICIAL PUBLICATION

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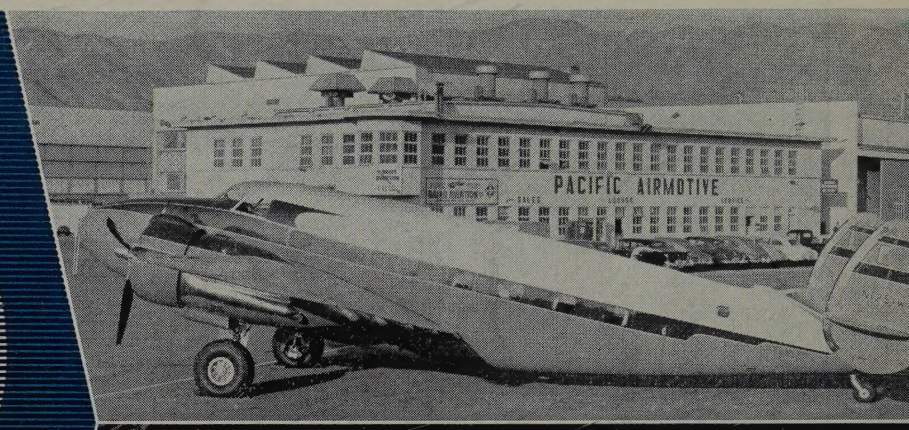

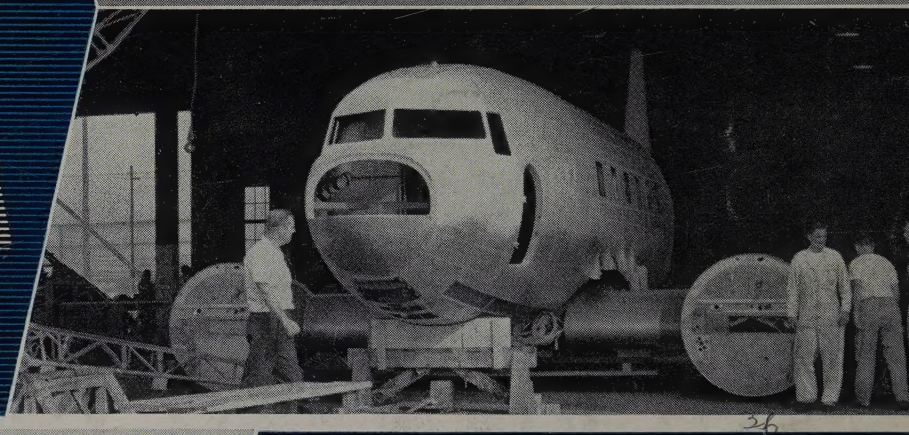

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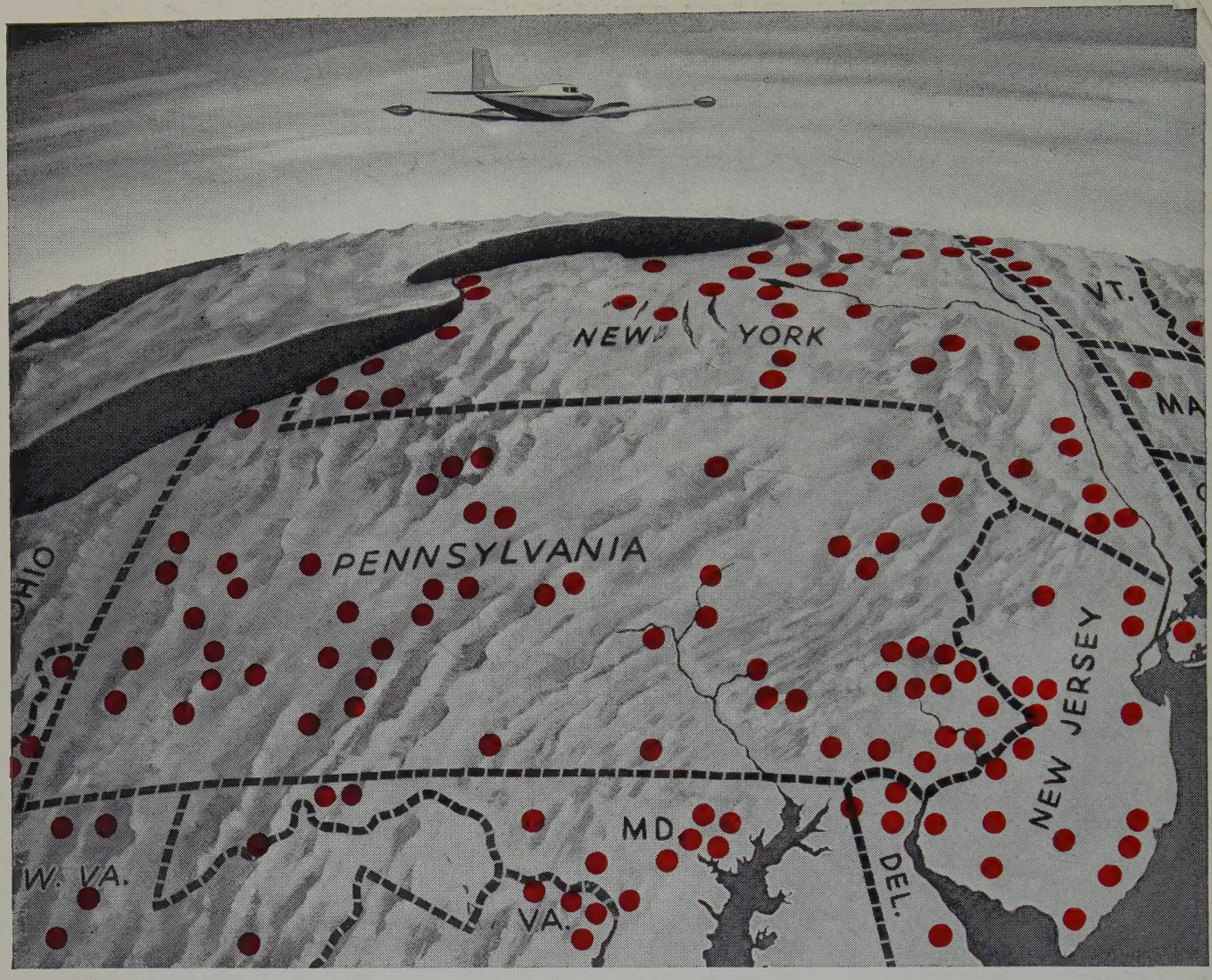

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R. B. Somerville (right) and Pilot Mike Uramkin plan an Apache flight

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Mike Uramkin, executive pilot for the Somerville Construction Co., logged over 400 hours in the Apache in the first six months after the company acquired the Piper twin. For shorter trips Mr. Somerville, a private pilot since 1945, likes to fly himself to the scene of jobs in progress in his Piper Pacer, shown above in front of the hangar that is directly in back of the Somerville home.

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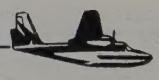

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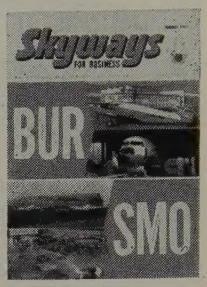
Skyways FOR BUSINESS

The official publication of the National Business Aircraft Association



COVER: Pacific Airmotive Corp. Serves corporate and private operators landing at Lockheed Air Terminal while its new subsidiary, PacAero Engineering Corp., offers expanded facilities for modification and overhaul of business aircraft at Santa Monica, Cal.

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BPA
Member Business Publications Audit of Circulation, Inc.

VOLUME 16, NUMBER 1

SKYWAYS is published monthly by Henry Publishing Co., 122 East 42nd St., New York, N.Y. Printed in the U. S. A. Single copy; 50c. Subscription Prices. U. S. Possessions, Canada and Pan Am. Union, $9.00 for 3 years, $7.00 for 2 years, $4.00 for 1 year; all other countries add $1.50 per year for postage. Please give title, position and company connection when subscribing. Six weeks required for address changes (give both old and new). Manuscripts, drawings, other material must be accompanied by stamped, self-addressed envelope. SKYWAYS is not responsible for unsolicited materials. Accepted as controlled circulation publication at Bristol, Conn.
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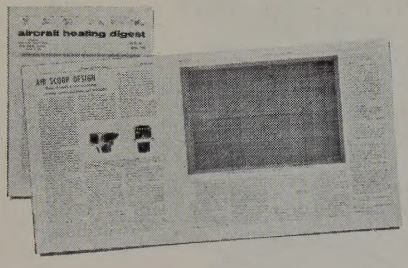
From time to time I've mentioned that you can mail a postcard to me to get your free subscription to AIRCRAFT HEATING DIGEST. But maybe you haven't yet because you don't know what it's all about . . . well sir, here's a picture of one issue.



AIRCRAFT HEATING DIGEST keeps you up to date on the newest developments in aircraft heating, gives a lot of basic information not found anywhere else, and has "how to" tips you can use. I have a column where I answer your questions . . . the tougher, the better!

Here's a rundown of typical articles appearing in the past:

AIR SCOOP DESIGN
SUPER DC-3 HEATING SYSTEM
CHECK LIST FOR HEATING SYSTEM DESIGNERS
AIRCRAFT HEATER OVERHAUL PROCEDURES
HEATER CLEANING TECHNIQUE
DETOURING THE HEAT BARRIER
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AIRCRAFT HEATING DIGEST is good reading for anyone who owns, flys, or modifies anything from a light twin to a Globemaster. Send me a card or letter today and I'll see that you get your free subscription.

Cordially,

Joe

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now hear this...

Orville L. Wilkinson has been appointed Sales Manager—New Products of Hydro-Aire, Inc., aviation subsidiary of the Crane Co. **Larry Adams** has joined Hydro-Aire to take over Wilkinson's former duties as Product Sales Administrator. Hydro-Aire is at Burbank.

George A. Clark has become Service Manager for Dallas Airmotive.

Stephen H. Badgett has been appointed Vice President of Operations of Aeronca.

Leonard C. Mallett has been named General Nanager of Pratt & Whitney's Connecticut Operations. **Charles T. Roelke** is new General Manager of P&W Florida Operations, and **Newton V. Turney** is new Divisional Controller of P&W, Florida.

William Q. Nicholson has been appointed Chief Staff Engineer for Hycon Mfg. Co. Nicholson was previously Engineering Director of Hycon Instruments Div.

A. R. Ogston has become technical Consultant of the Aviation Dept. of Esso Export Corp. The position is newly authorized, concerns fuels and lubricants for long-range planes. **E. O. Petzold** is now of the Technical Service Div. **J. P. Acton** is now head of Field Service Div., a group devoted to safety in aircraft refueling and other aspects of airport service.

Bernard W. Lueck, General Sales Manager for the reinforced plastic products div. of Minnesota Mining & Mfg. Co., has been elected Vice President and a director of Zenith Plastics Co., a new subsidiary of 3M.

Edwin W. Carl has joined Narco, Fort Washington, Pa., as Senior Mechanical Engineer. Mr. Carl spent 17 years with Martin in electronic equipment installations.

R. G. Ervin, Jr., has joined Hawk Helicopter, Fort Worth, as Vice President and Manager. Hawk provides service for offshore oil drilling and other copter operations.

Robert S. Pares was named a Field Engineer for the Aeronautical Div. of Robertshaw-Fulton Controls Co., Anaheim, Cal.

Dr. Donald D. King, former Director of the Radiation Laboratory at Johns Hopkins Univ., has been elected Vice President in charge of Research for Electronic Communications, Inc., a subsidiary of Air Associates in Baltimore, Md.

William Sendell has been appointed General Products Productions Manager of the Red Bank Division of Bendix Aviation Corp.

Donald C. Erdman, former President of Electro Circuits, Inc., has been appointed Assistant to the President of Sperry Products, Inc., Danbury, Conn.

Federal Telephone and Radio Co., Clifton, N. J., a division of IT&T, has announced the award of a contract by the Bureau of Aeronautics for airborne Tacan in the amount of $18,903,150. Announcement was made by FTR President Raymond S. Perry.

Link Aviation has scheduled for Jan. '57 the opening of a new laboratory at Palo Alto, Calif., under the supervision of Earl D. Hilburn. Projects at Palo Alto are to include computing systems and transistor circuits.

USAF — NBAA

Jet "Know-How" Symposium

Wright Air Force Base
Dayton, Ohio

Feb. 7-8, 1957

The program is sponsored by the Air Force to give Business Aircraft owners and operators the complete story on jet engine maintenance, new radio equipment, hardware—

A complete roundup of Air Force Jet knowledge to date

Invitations are limited To NBAA Members only

Registration Deadline:
JANUARY 19

New NBAA Members

The following new members were admitted to NBAA at the November meeting of the Board of Directors held at NBAA headquarters, Washington, D. C.

Regular Members

Barber Colman Co., Rockford, Ill. NBAA Rep.: Robert C. Seitz, Chief Pilot.

E. Cockrell, Jr., 2030 Bank of Southwest Bldg., Houston, Tex. NBAA Rep.: Tom R. Neyland, Chief Pilot.

Cole-Layer-Trumble Co., 11 West Monument Ave., Dayton, O. NBAA Rep.: John D. Cole, President.

The Columbia Gas System, Inc., 120 East 42nd St., N.Y.C. NBAA Rep.: Arthur W. Stewart, Dir. of Transportation.

C. H. Dexter & Sons, Inc., Windsor Locks, Conn. NBAA Rep.: Dexter D. Coffin, President.

The Diamond Match Co., 122 East 42nd St., N.Y.C. NBAA Rep.: L. W. McCracken, Chief Pilot.

Dixie Aluminum Corp., 102 North Hanks St., Rome, Ga. NBAA Rep.: Clifford H. Pope, Chief Pilot.

Food Fair Stores, Inc., 7000 North West 32nd Ave., Miami, Fla. NBAA Rep.: A. J. Maloff, Southern Div. Mgr.

Standard Oil Co. of California, 225 Bush St., San Francisco, Cal. NBAA Rep.: K. V. King, Aircraft Operations.

U. S. Industries, Inc., Box 157, Stratford, Conn. NBAA Rep.: R. G. Reckner, General Manager.

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(*Continued on page* 15)

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...with Land-O-Matic* landing gear...tapered high wing... 57 other exclusive features in the big new '57 Cessna 172

*the feature that's revolutionizing flying.

More and more pilots are proving it: the big Cessna 172 is easier, more stable and comfortable to fly... does have dozens of extra features not found in any other low-priced plane! That's why it quickly became the largest-selling airplane!

From its smooth 145-H.P. 6-cylinder Continental engine, world record holder for endurance flight... through its larger, more-handsomely appointed cabin... to its Land-O-Matic landing gear that shrugs off shocks from short, rough landings and take-offs... here is an airplane so far ahead of its class you must see and fly it yourself to fully appreciate its value! And a Cessna 172 (with std. equip.) is priced at just $8,975... f.a.f. Wichita.

So get proof—in flight today from your nearby Cessna dealer (Yellow Pages of phone book) or write: CESSNA AIRCRAFT CO., DEPT. S-3, Wichita, Kans.

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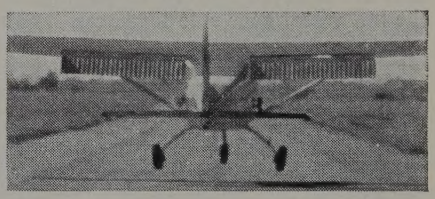

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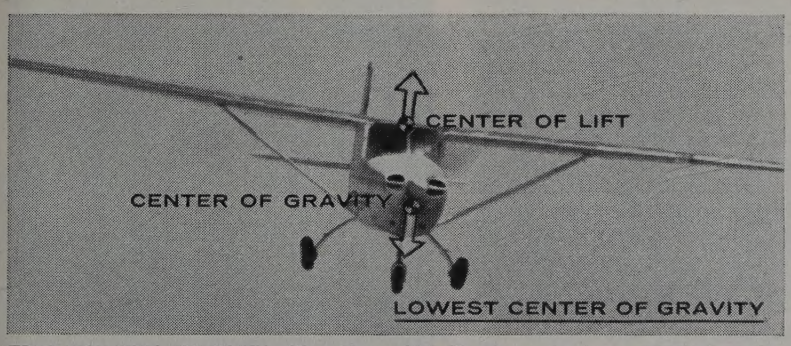
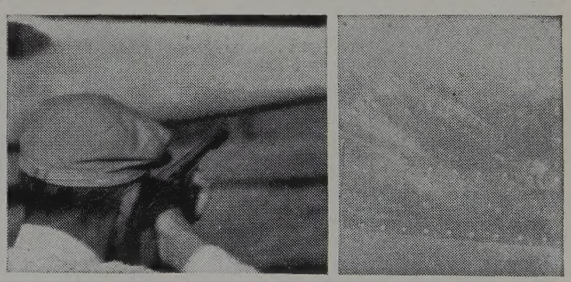


TRUE HIGH-WING STABILITY with a bigger, high-lift wing and a lower center of gravity than any other plane in the low-priced field! You do less trimming, compensating in flight—enjoy a "big-plane feel."

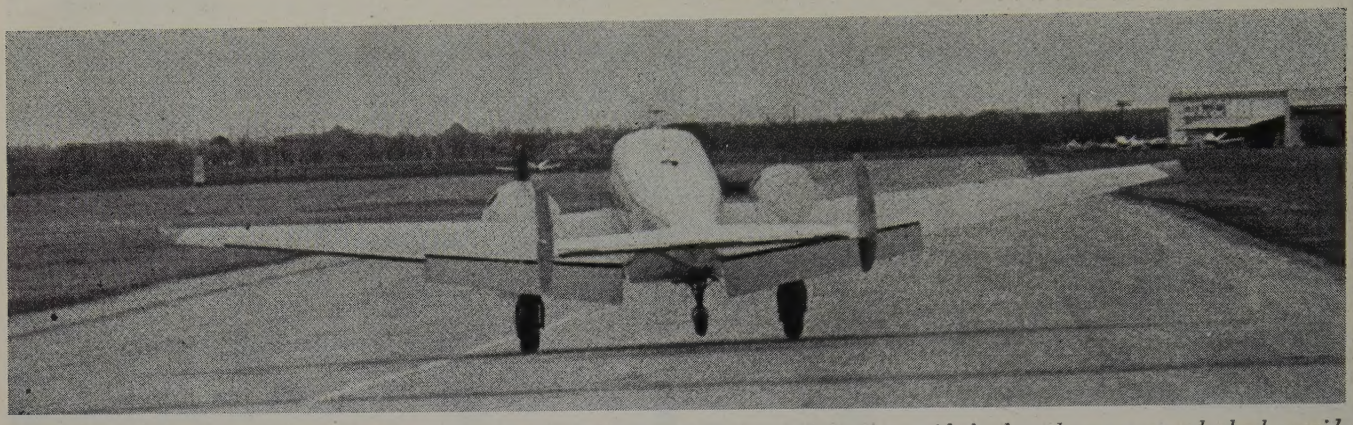


RUGGED ALL-METAL CONSTRUCTION. It's even shotgun-tough, as shown in these unretouched photos! Stays just as tough after years of service! And the Cessna 172 is the only all-metal airplane priced so low. Inside, too, you find quality through and through—newly designed luxury interiors for '57, far more baggage capacity, and the fullest windshield visibility in its class.

4 GREAT CESSNAS 172 180 182 310 THE COMPLETE AIR FLEET FOR EVERY BUSINESS NEED

Cross Wind Landing Gears

By J. H. Geisse



BEECHCRAFT SUPER 18 *is shown demonstrating a cross-wind landing with the Geisse Safety Gear. Weight shift to castered wheel on downwind side automatically limits the side load on the non-castered wheel, providing "a positive guarantee" against roll-over.*

The recent release by the Civil Aeronautics Administration of its analyses of all serious accidents in general aviation in the years 1954 and 1955 prompts this article. In its classification of accidents, ground loops plus roll overs lead the list with a total of 1340 such accidents in the two years. These accidents accounted for the complete destruction of 61 airplanes and substantial damage to another 1276. Most of these accidents in addition to some of the others could have been avoided by the use of cross wind gears.

The term cross wind landing gear is perhaps an unfortunate one. The tire side loads it controls are the result of pilot action much more often than they are the result of cross winds. With the tail wheel gear side loads can build up very rapidly to the point where the turning moments they produce far exceed the counteracting moment the pilot can apply. And with the nose wheel type of airplane, application of the brakes to reduce these side loads can provide just the additional moment required to roll the airplane over.

That accidents which might have been avoided by the use of cross wind gears are not infrequent, limited to unskilled pilots, or limited to tail wheel types of undercarriage, is clearly shown by accident records.

They include accidents which might have been avoided if the pilot's choice of runway had not been dictated by cross wind considerations.

An example was the BOAC accident last year at Tripolitania, Libya, in which 15 lost their lives. Because of a cross wind on the principal runway the pilot made four attempts to land on an auxiliary runway with inadequate landing aids and crashed on the last one. The airplane was a Canadian DC-4 and a DC-6 landed on the same runway under the same conditions about an hour later. The significance of the latter was not that the DC-6 pilot made a successful landing but that he also preferred to land on the auxiliary runway in preference to going in across the wind.

Included are many under-shooting and over-shooting accidents which have constituted a fairly large percentage of all air transport accidents. These might have been avoided with the longer runways which could very well have been provided if it had not been considered necessary to have runways in several directions to cover the wind.

They include over 50% of all the serious accidents to one popular tail wheel airplane in one year and 28% of all of such accidents to a popular nose wheel airplane in a subsequent year.

Neither accident statistics nor operational practices bear out contentions that tricycle gears can safely contact the runway with any amount of drift. It is regular practice for airline pilots to use the same cross wind landing technique with tricycle gears as they have used with tail wheel gears. At least one manufacturer of transport aircraft bases its claim for cross wind performance on the amount of lateral control provided in its airplane.

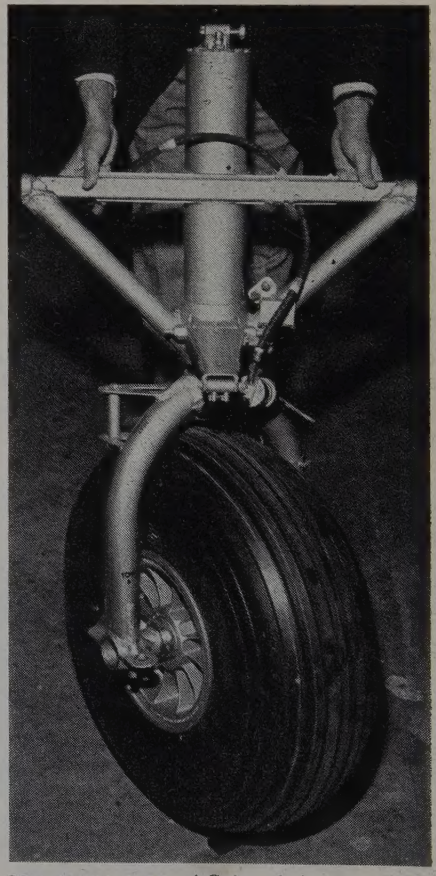
That this is not an acceptable answer to cross wind operations appears to be evident in the current opposition of ATA and ALPA to the single or parallel runway concept.

Eliminating drift in a cross wind landing by side slipping has its disadvantages even when done by a skilled pilot. If all of the lateral control were used in one direction to establish the necessay side slip, none would be left in this direction to take care of gusts. The amount of cross wind that can be accommodated is therefore dependent upon how much lateral control the pilot believes he can safely sacrifice under the prevailing conditions.

In addition, this type of landing involves a substantial increase in touch down speed and landing roll over that which would be required with a cross wind gear. Some of this increase will be voluntary on the part of the pilot to improve lateral control. Some will be due to the effective decrease in wing area. Most will be due to the fact that advantage is not being taken of the cross wind component to reduce the ground speed.

Many pilots do not understand that they can have the safety of cross wind gears without the other characteristics of freely castered wheels which they do not like. It is quite possible to build cross wind gears to function like a safety valve on a boiler, *i.e. to operate only when failure to do so would result in an accident.*

From the freely castered wheel to the wheel which casters only when neces-



LEFT MAIN GEAR *of Geisse Safety Assembly shown castered outward as it would upon contact with runway in crosswind landing.*

sary to avoid an accident, there is a wide range in performance available to the designer. The choice is in the relationship between the side loads on the tires and their castering angle.

The side loads on the tires are almost directly proportional to the weight supported by the tire and the angle between the heading of the wheel and its path—up to about 15 degrees. This angle is called the cornering angle in automotive practice. With a freely castered wheel the cornering angle is always zero. With fixed wheels it is the same as the drift or yaw angle of the airplane. With castered wheels having caster restraints the cornering angle is the difference between the yaw angle and the caster angle. The side load is practically independent of the speed and remains substantialy constant at angles in excess of about 15 degrees.

These side loads on the tires generate turning moments on the airplane—one tending to roll the airplane around its horizontal axis and the other tending to turn it around its vertical axis. *The rolling moment is manifestly undesirable. The turning moment is also undesirable when not under direct pilot control. However these tire side loads are essential to adequate taxi control and without them the path of the airplane on the ground could only be controlled by directing the propellor thrust in the desired direction.*

Here then is where the cross wind landing gear designer must make his choice, i.e. to what extent shall taxi control be sacrificed to reduce the rolling and turning moments? *With the tail wheel undercarriage the choice is between taxi control and turning moment. With the nose wheel type it is between taxi control and rolling moment.* In both cases there is an upper limit. The turning and rolling moments must be kept below dangerous maximums.

Advocates of a large sacrifice in taxi control point out that with such an undercarriage an airplane landed in a drift has no appreciable tendency to turn and will go down the runway sidewise without any attention on the part of the pliot. Also on take-off it will head into the wind during the take-off run so that no correction will have to be made for drift at breakaway. This also takes maximum advantage of the wind in reducing take-off run.

Its disadvantage is that the path of the airplane can not be changed rapidly except by the expedient of swinging the airplane far enough to bring the wheels up against their castering stops, and then the change can be made in only one direction — depending on which way the wheels are castered. This causes a delay in steering response which can result in an accident.

At the other extreme, i.e. the safety valve type of gear, an airplane so equipped, if landed in a severe drift, will start to ground loop if it is of the tail wheel type, and to roll if it is of the nose wheel type. However, the roll will *not* be dangerous and the ground looping moment will always be *less* than the counteracting moment which the pilot can apply. With such an undercarriage no usable performance of the airplane is sacrificed, but the drift landing will not be as smooth as with the freely castered wheel.

Two types of cross wind gears with castered wheels are now in use in this country. The one best known was developed by Goodyear in cooperation with the CAA. The other, developed by the author, is a cross between fixed and castered wheels.

The Goodyear engineers favored low castering restraint and used two devices to minimize its disadvantages. For the smaller airplanes a cam was provided with a central groove to provide a fairly high caster restraint to initial castering. After castering was once started the restraint was quite low. For the larger airplanes the gear was provided with a control by which the pilot could lock the gear in the non-castered position.

This gear was approved by the CAA for airline use on the DC-3 with cross winds up to 40 mph. It was sold in substantial numbers for the smaller Cessna's and was standard equipment on the Cessna 195.

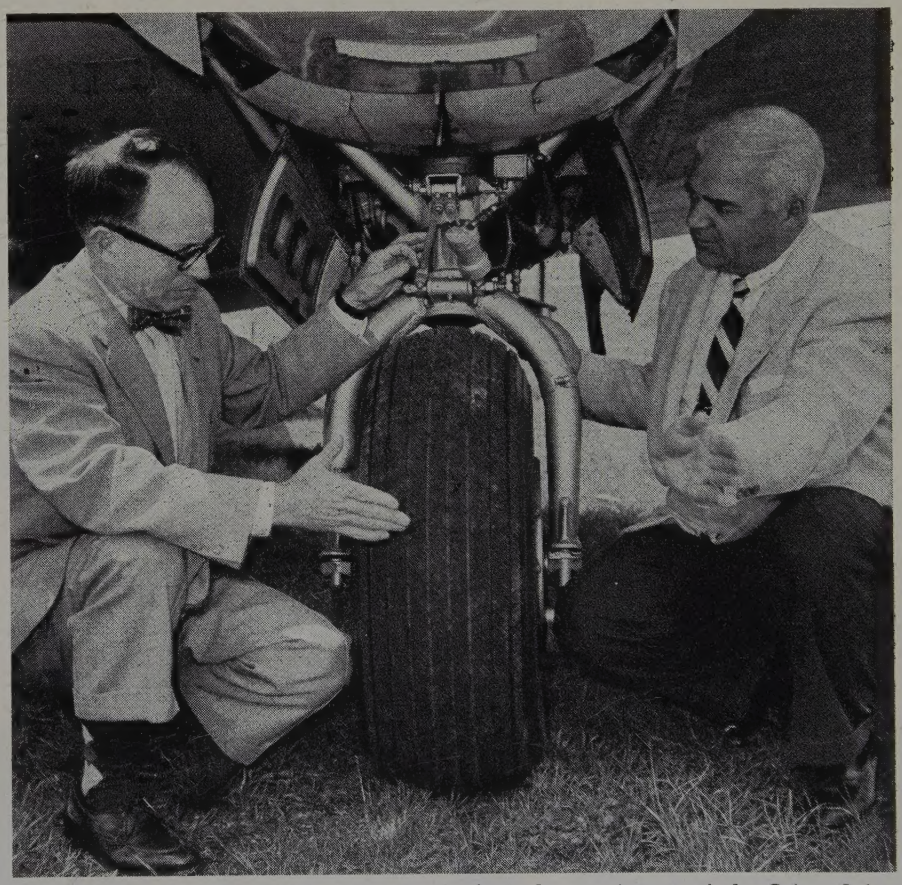
In the Geisse Safety Gear the fuction of the castering restraints is taken over by inward castering stops. The wheels can nose out quite freely but can not nose in. Since the side load on each wheel is dependent only upon its own cornering angle and the weight it supports, removing the side load from one wheel immediately cuts the total side load in half. Actually it does more than this when the wheels can nose out but not in, as the weight of the airplane tends to shift to the nosed out wheel. *This shift of weight to the castered wheel automatically limits the maximum side load which can be impressed on the non-castered wheel* and provides a positive guarantee against roll over due to the inertia forces in a drift landing or sharp turn. In cross wind landings with this type of gear the airplane assumes a heading down the runway in about the first quarter of the landing roll. It has no effect on normal taxiing or ground handling.

This type of gear has been tested and approved by the Navy on the SNJ, by the Marines on the OE, by Cessna on the 170, and by Beech on the Super E 18. It is now being sold by the latter as optional equipment on that model. These gears have been in use on Cessnas for some time and owner reaction has been favorable.

The advantages of cross wind operations are numerous and some are not generally appreciated.

The first is, of course, that the cross wind gear permits factors other than wind coverage to dictate the selection of airport sites and the design of the airport. Among these factors are some involving safety of operations such as

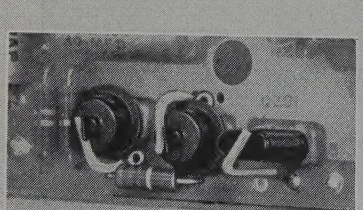
(*Continued on page* 13)



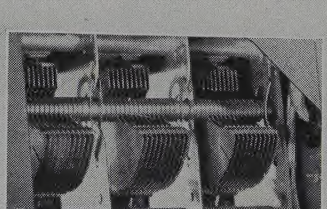
GUY MILLER AND HERB FISHER *talk over the limited-caster feature of the Geisse Safety Assembly, which permits the wheel to caster outward freely but prevents inward caster. The 'outward only" caster represents a compromise between the freely castered wheel, which has an inevitably slow response to ground steering control, and the "safety valve" type gear, which has more restraint on the castering movement, to facilitate ground handling, but which is not as smooth in a drift landing as a freely castering wheel.*

You are now looking at the world's mo

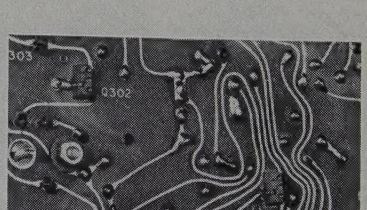
Lear builds it...the all new all-transistorize



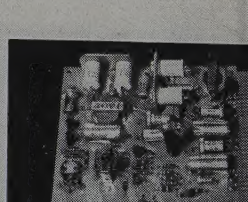
TRANSISTORS minimize ADF-100's overall size and weight, afford unprecedented dependability, reduce power consumption to 1/10 that of other ADF's, and completely eliminate warm-up time.



PRECISION TUNING CAPACITOR is highest quality type, heretofore found only in heaviest, costliest ADF's. ADF-100 tuning system has highest calibration accuracy of any ADF.

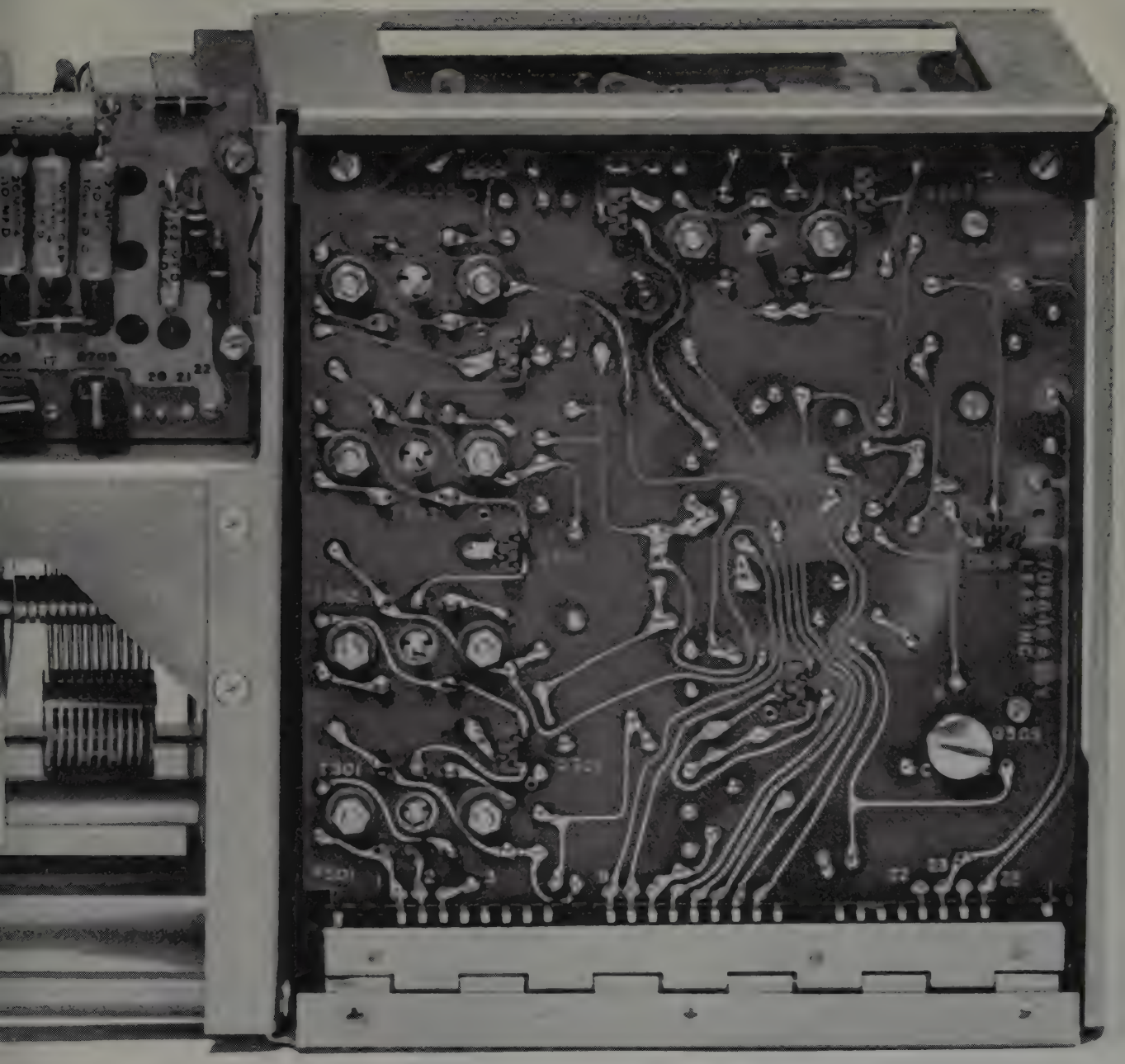


ETCHED CIRCUITRY contributes significantly to the ADF-100's light weight, small size, low cost, and high degree of reliability. 80% of all the circuitry in the ADF-100 is etched.



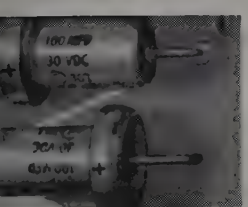
MODULAR CONSTRUCTIO cludes two principal back-t circuit boards which plu hinge-mounted connectors boards are easily removabl

lvanced Automatic Direction Finder

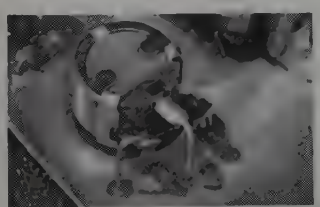


EAR ADF-100

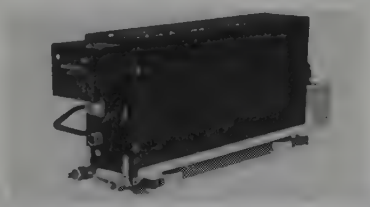
Write for detailed specifications or ask your Lear dealer. LEAR INC., LearCal Division—3171 South Bundy Drive, Santa Monica, Calif. LC-38



LYTIC CAPACITORS, instead ventional electrolytic units, lized throughout, providing increased reliability through ider temperature ranges.



PHASE-CONTROL POTENTIOMETER, easily adjustable, assures maximum loop antenna torque, providing positive loop rotation even under extreme temperature conditions.



MOST COMPACT AND LIGHTEST WEIGHT of all airline calibre ADF's, the complete ADF-100 system weighs only 18.5 lbs. The receiver unit is ⅜ ATR rack (21 x 4¾ x 8⅜ inches).

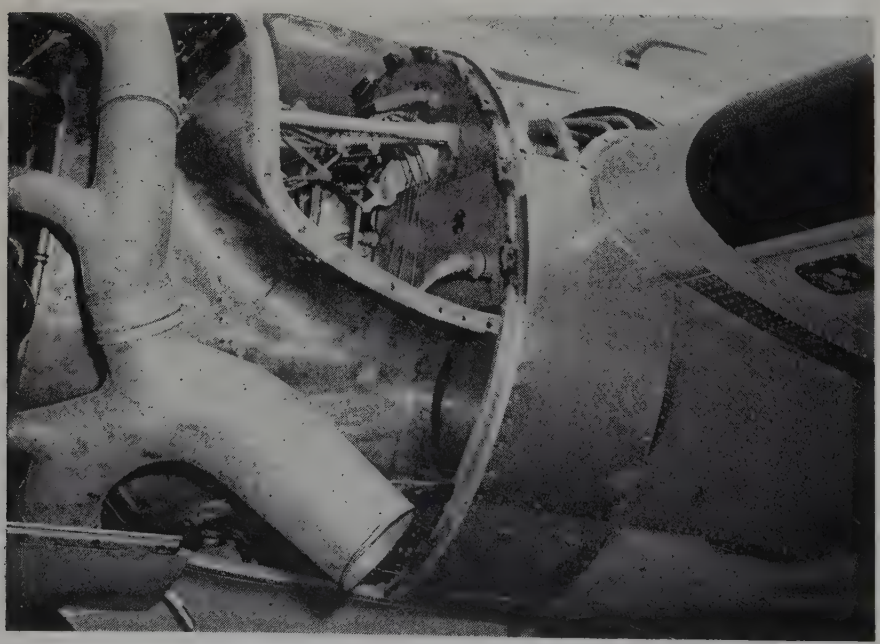
CAA APPROVED FOR AIRLINE USE, of course, the ADF-100's new high levels of performance and dependability uniquely qualify it for the most demanding transport or executive plane applications.

J & L *Lodestar* Adds 50HP Per Engine

A six to eight mile an hour increase in true air speed of Jones & Laughlin Steel Corp.'s executive Lodestar is credited to the installation of short stack, DC-3-type collector rings by Pacific Airmotive Corporation, according to Capt. Charles E. Paul, J & L's chief pilot.

Following the modification, which was completed recently at PAC's Burbank Aircraft Division, Capt. Paul experienced an increase of 50 usable horsepower per engine. The single-engine ceiling of the aircraft was raised an additional 1500 feet.

SHORT STACK MODIFICATION *completed by Pacific Airmotive on the Jones & Laughlin Lodestar assures that all exhaust flame and heat are directed away from the nacelle and wing. Smooth nacelle was achieved by reskinning over the old exhaust pipe wells.*



NO MODIFICATION *to "dishpan" was required on the Jones & Laughlin Lodestar for installation of Pacific Airmotive Corporation's collector ring and short stack modification.*

The original exhaust system of the Wright R1820-72 engines in the J & L Steel Lodestar, with its troublesome ball joints and long tail pipe, was completely eliminated in the modification, according to L. B. Littrell, PAC vice president. The engine nacelles were reskinned to cover the old exhaust pipe wells.

Littrell said that PAC mounted the new collector rings and short stacks to the engine only, thereby eliminating any direct connection with the airframe. As a result, the engine and exhaust vibration which was formerly transmitted throughout the entire airframe is now confined to the engine and cowling.

Elimination of the long tail pipe in the conventional Lodestar exhaust system has lessened the back pressure, resulting in the increase in the horsepower output of the engines and the greater operating efficiency of the engine. The modification also adds greater fire protection by directing the exhaust away from the nacelles and wing of the aircraft, according to Littrell.

Capt. Paul reports a remarkable reduction in cylinder head temperatures following PAC's modification of the J & L Steel Lodestar. At cruise settings with 58 percent power in auto-lean, temperatures are averaging about 160° C., compared with an average of 185° C. with the old exhaust system. Since the short stacks were installed, temperatures have never gone above 185° C. even on takeoff with a 19,500 pound gross load, according to Paul.

"At 13,000 feet with 62 percent power, 300 gallons of fuel, two passengers and crew, we are making a true air speed of 241 miles an hour," Paul wrote to PAC. "Our passengers remark on the quietness and lack of vibration in the cabin. All in all, this is a wonderful improvement to our Lodestar. We feel the modification will greatly reduce all of our maintenance, not only on engine but on airframe, instruments and radio.

"We are planning to bring the company's other Lodestar out to Burbank for the same treatment," Paul concluded in his letter to PAC.

Littrell said that a new PAC-designed and engineered carburetor heat muff which becomes a part of, and lifts off with, the top section of the engine cowling was also incorporated in the J & L short stack modification. The new heat muff completely replaces the old 3-piece, clamp-on muff and greatly simplifies servicing of the engine. It provides a carburetor air temperature rise of up to 90°F. and permits easy access to spark plugs.

"In addition to Lodestars with Wright R1820-72 engines, PAC's new short stack exhaust system modification can also be installed in Lodestars with R1820-56 or Pratt & Whitney R1830 series engines," Littrell said. "The system is also adaptable and can be installed on DC-3 aircraft with either Wright or P.&W. engines."

Chairman: Henry W. Boggess, Sinclair Refining Co. Moderator: Cole H. Morrow, J. I. Case Co. Panel Members: Norman Beuter, Chief Controller, ARTC, N.Y.; Bert A. Denicke, Chief, Systems Requirements Group, ANDB; John H. Hilton, Office of Air Traffic Control; Walter A. Jensen, Operations Section, ATA; Max Karant, President, AOPA; R. C. (Ace) Robson, American Airlines; Maj. Louis C. Sadek, USAF, Chief, ATC, Colorado Springs; Robert E. Sheriff, Chief Pilot, Thompson Products, Inc.; Col. Harry Shoup, USAF; D. M. Stuart, Director, ATC/TDC, Indianapolis.

SKYWAYS FLIGHT OPERATIONS ROUND TABLE

ATC Panel

Substituted in this issue for the regular Round Table

Cole H. Morrow *(Moderator):* "The theme of the NBAA Forum has, so far, been questions and answers, so none of these gentlemen have come prepared with canned speeches and they are here primarily to answer your questions.

"You heard Mr. Rothschild announce plans for traffic control, which, in the majority are from two to five years away, but all of us are concerned with the problem of today. In spite of all of the publicity given to the inadequacies of air traffic control, I think it is unfair to make a blanket condemnation.

"After all, traffic *is* moving and more of it is moving than would have been thought possible five years ago. I don't think we can handle a great deal more, but so far as I know, there have not been any plans to shut anybody down or interfere with his operation.

"I think it is an unfair condemnation of the people in traffic control and our present traffic control system to describe it as being inadequate, obsolete, or out-of-date, when you consider that Chicago Center alone handles more traffic every day than all the rest of the world combined excepting Russia. What we do at one airport in this country would be considered absolutely impossible in Europe.

"To start things off, I would like to call on Jack Hilton."

John H. Hilton: "Mr. Rothschild's speech was excellent. However, there are some items on which he did not touch. For example, the normal expansion of airport traffic control facilities which will go on during this period, and the fact that during this three year period we will get into the implementation of Airport Surface Detection Radar at a number of airports to improve the handling of air traffic on the ground.

"There are items like approach lights which will aid in making approaches in poor conditions to a number of additional airports. We will be expanding VHF direction finding facilities at a great many locations.

"Of course, this will prove quite a benefit in assisting aircraft that are lost, in assisting aircraft for radar tracking purposes and many other things.

"There will be some expansion of the P.A.R. program, the I.L.S. program, and other items. I think the only other thing I need say is that some pretty exhaustive studies in simulation, paper studies and so forth, have indicated that the capacity of an instrument runway is about forty movements an hour when we are fully equipped with radar.

"We have achieved this type of an operation at some locations today. Through the expanded tools and facilities and the increased personnel that will be available to us through the Federal Airways five year plan, we will have this capability in a great many airports where it does not exist today. I think it is safe to say that at many places where we have a special airspace problem, because of the proximity of airports, we will be able to come much closer, if not exactly meet this goal, because of the expanded use of radar which provides minimum separation between traffic.

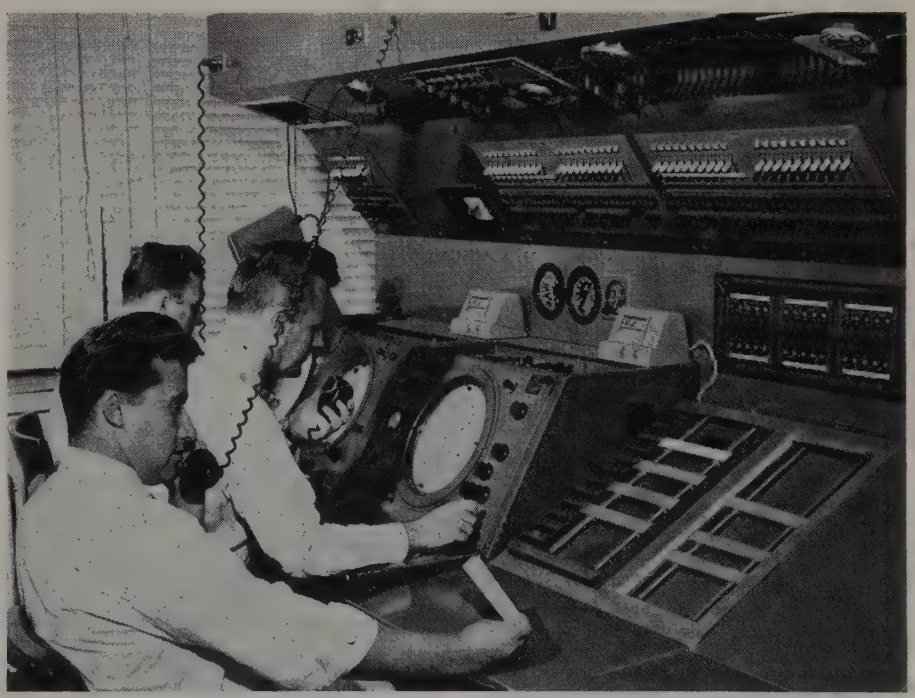
There are, as you are probably well aware, many places where the airports themselves are so located with respect to each other, that they present a structural problem to traffic control. Through the facilities and the tools that will be available in the system as a result of this tremendous three year program, I think we will come pretty close to meeting this goal of forty movements per hour for an instrument runway at most airports, and the greater capacity at some of the dual runway airports."

Morrow: "Thank you. How about you, Major Sadek?"

Major Louis C. Sadek: "Speaking for the Air Defense Command, our interest in operations in the air control field are so closely allied with the C.A.A. that I think further comment would be unnecessary."

Morrow: "Captain Jensen?"

Capt. Walter A. Jensen: "From the ATA standpoint, it doesn't look like we are going to get entirely new procedures or equipment within the next few years, at least not on the grand scale we



NEW YORK INTERNATIONAL *Instrument Flight Rule room, showing the control console. All instrument landings are controlled from this room. At the rear, CAA Electronic Engineer George Rabin monitors two scopes of precision approach radar following actual landing of plane which is controlled by ILS equipment. Airways Operations Specialist Ralph D. Burns, Jr. (center), is at scope of airport surveillance radar, which shows the position of all aircraft within a 30-mile radius approaching and departing from the airport. Airways Operations Specialist John H. Fitzgerald (front) holds flight progress strips, on which information on position and altitude of each plane being controlled is entered.*

would like to see. We are not going to get all the fancy computers, electronic brains and the automatic systems they have been talking about and so on, which aren't in existence yet.

"The C.A.A.'s original five year plan has now become a three year plan. We are going to have from that plan expanded training of controllers, and that is certainly a worth while program.

"We are going to have some of the aids that Jack Hilton mentioned, such as more approach lights of the type we now have in a few locations. We will have a few VOR's in places where there is a gap now. In addition to VOR, we will have variations of the types of aids that we now have. I believe in this immediate period it is an evolutionary process that Mr. Rothschild spoke of.

"Let's try to take just what the problem is. It would probably go something like this when we get to traffic control. The industry is expanding greatly in all respects, so we have got to handle more aircraft; we have to handle them in more areas. We have to expand the control of those aircraft and to go into areas that are not covered, in the area concept. The aircraft themselves will have wide-spread range in their capabilities and that constitutes part of the problem. We must expand the safety aspect of traffic control along with its efficiency."

Morrow: "Bob, do you want to add to that?"

Robert E. Sheriff: "All I want to add is this: what can we do today to help eliminate all or some of this with our existing equipment and the existing airways? I have a few ideas of my own that I would like to toss out at this time. They deal with communications and speed control.

"Now, gentlemen, if you want to jump into your aeroplane and go into the New York area you may encounter some of these problems. It doesn't have to be 200-½ it can be 1000-3 or 1000-2 —we have experienced that problem. With our existing equipment and going through this expansion plan that we have, what can we do?

"I would like to have some of your comments on my feeling that there are several areas for immediate improvement and many problems in the classification of communication and speed control—I think that we are doing a lot of unnecessary chatter and unnecessary reporting to the airway traffic control centers.

"I think that if an aeroplane passes over a given fix within a certain limit of time and it is reported that he will be there, I think it is unnecessary to get on that line and say something. I think the 'initial contact' idea should be thrown out the window.

"If you are talking to some small station in Texas, the boy might be out in the backyard; whereas in New York, or Washington or the Chicago Centers, the man's right there. You can contact and simply state your position and your progress, and eliminate all this chatter because sometimes we cannot get a word in edgewise, in heavy areas.

"Speed control would make things easier for controllers, and it can be incorporated in existing aircraft. I don't know the distance to set it out, but fifty to seventy-five miles, I guess, would be the area where all aircraft would cruise, descend and everybody have the same given airspeed, which would be a big improvement."

Morrow: "Norm Beuter, will you comment on what has been said on communications?"

Norman Beuter: "We have, in the New York area, about the most comprehensive communications coverage of any area in the world. Currently, we have between 22 and 26 UHF and VHF frequencies. That is being expanded rapidly along with the establishment of the overall air-ground frequency coverage throughout the Continental United States.

"In some cases, we pair the UHF with the VHF but in some cases we do not. We intend, as far as we know presently, to retain the VHF. We are now going into 100 kilocycles separation, using the 100 even kilocycles as well as the odd. We already have one installation there in the New York area, and a couple more at Washington which we are using.

"I believe most of your type of aircraft are equipped for that coverage, and if they are not, it would be a good thing to equip your aircraft to receive the 100 kilocycles separation.

"Rather than giving you a general discussion of those two subjects, I would prefer that you ask further questions about the New York area and I will attempt to answer them."

Morrow: "Before we get completely off the speed control question, I wonder, Ace, if you are familiar with some of the work that has been done on that?"

Ace Robson: "I hear a lot about these several year programs which are all well and good. But it doesn't work out that way. I still have the same delays.

"On speed control, the A.L.P.A. has become aware of this traffic control problem. It is our bread and butter too, and we have recently taken several polls on the pros and cons of it.

"Generally, we feel that it is a good idea that there should be some speed control because it can prevent certain things from happening which we all know about. We would like to see it looked into a lot further.

"There is, for instance, the argument against it that there are many times when the pilots can see the picture quite clearly and by adjusting their speed, they can save an extra circuit at the airport. So speed control is very definitely in the picture. However, I would not say that we should regard this 156½ knot business as ironclad. It should be explored and used to advantage. It certainly has a place.

"Communications is to me the real crux of the problem. We are all talking about instrument flight, but as was mentioned, you can come into the LaGuardia area VFR and spend ten or fifteen minutes trying to land because of the communications. Communications is a major problem. Without it, you don't do anything.

"If you cannot get your message to the aeroplane or the aeroplane cannot get the message to the ground, it doesn't matter what kind of fancy equipment you have. Our communications has reached a point where we are not now worrying about excess wordage, we are worrying about excess syllables.

"I think we need somebody to take hold of the immediate problems. Let us revise a lot of these terminologies; the radio telephone procedures give more people a chance to get on the air. I think we can do an awful lot to speed up traffic that way."

Morrow: "There is a comment from the audience. What is your name, sir?"

Member of the Audience: "Wood. Along the comment of extra transmissions from the aircraft, the same thing can apply to air traffic controllers, especially ground controllers who make many unnecessary transmissions about turning off the runway when there is no other way to turn. I think that about 50% of the air traffic communications can be eliminated by the air traffic controller as well as the aircraft."

Morrow: "Thank you very much. I think that some of the communications added on by Ground Control personnel are a legal requirement. Now, maybe some of the C.A.A. men would like to comment on that."

Beuter: "I would like to comment on this a little. We get it on the other side too, gentlemen. If you were at Idlewild Tower and attempted to understand Swiss Air, Air France, SAS—you would understand what the traffic there really was. At least, you are listening to English, even if it is Brooklyn.

"On the other hand, I listened to a Ground Control man at Idlewild the other day. The pilot came to me and said, 'What does that man mean? He said, "You are taking a taxi round the gray circle."'

"Now, unfortunately, his destination was Frankfurt so he didn't know whether the man was giving him his route of flight or whether that is the way he wanted him to taxi. In that case, perhaps it was cutting the phraseology just a little too short. So, there's two sides to it, gentlemen."

Morrow: Certainly something should be done to try to cut down the verbiage required, and simplify things a little bit."

Member of the Audience: "May I say a word on that?"

Morrow: "Yes, sir."

Member of the Audience: "We find that there are too many people in Washington who assume that the exact phraseology in the ANC manual for Procedures for Control of Air Traffic will always be followed without variation. We all know that, in actual flying, that is not the way it works.

"We are running a test, with a portable tape recorder hooked up in the cockpit, to pick up some of these things and take them to Washington so the CAA people can hear them.

"One of the suggestions that has been made by our people is to cut down the

(*Continued on page* 22)

DEHAVILLAND OTTER *goes amphibian with Edo floats, modified to accommodate retractable main and nosewheels. Mainwheel retracting mechanism is protected against corrosion by complete enclosure in float. Wheels and brakes are of aluminum for corrosion resistance. Floats are said to improve Otter's landplane characteristics, shorten landing distance, reduce cruise speed by only 3 mph, landplane takeoff only 10% longer.*

Cross Wind Landing Gears

(*Continued from page 7*)

length of runway, clear approaches, avoidance of flying over congested areas, better traffic control, etc. Others are economic, such as reduction in cost and area and more accessible locations. These factors are important to all airplane operators and may be particularly important to the corporate owner. Not infrequently the utility of the airplane to a company is greatly circumscribed by the lack of airports where it needs them. Eliminating need for wind coverage could make the difference between getting and not getting these needed facilities.

Another advantage of cross wind operations is higher acceptance rate of traffic. In the Berlin airlift it was found that the dust was blown off of the runway—which was across the prevailing winds—and operations were speeded up. The wind is equally willing to blow the turbulent wakes of airplanes off the runways and out of the approach zones if we will give it a chance.

The avoidance of flying in the wake of other airplanes is becoming ever more important due to the higher wing loadings and the introduction of jet propulsion. It can be avoided with cross wind operations at multi-runway airports by landing on an idle runway.

This freedom to select a runway on multi-runway airports has other advantages. First, the runway across the wind is not infrequently the longest runway with the best approaches and best surfacing. Second, a straight-in approach and/or the most convenient termination of the landing run can save time. Third, time can be saved by not having to wait for other traffic to clear the runway in use.

In conclusion the author would like to express his personal opinion that our ever increasing air traffic control problems and our ever increasing costs of runway consrtuction will sooner or later force the acceptance of cross wind operations as standard practice.

Accident Report

On November 8, 1956 at approximately 12:45 P.M., a Twin-Beech, D-18 type, struck the 810 ft. (1472′ msl) WOR-TV tower on the Palisades at N. Bergen, N. J., just opposite New York City across the Hudson River. Owned and operated by Gaseteria, Inc. and affiliate Bonded Gas and Oil Co. of Indianapolis, Ind., the occupants were the pilot, William Crowley and company executive Russell S. Williams.

The plane's left wing was sheared off and the aircraft dove into the top floor of a 5-story apartment house eight blocks northeast of the tower, killing three residents as well as the occupants of the plane.

The aircraft was on a VFR flight from Indianapolis to LaGuardia. The latest reported aviation weather at LGA was: 1239E measured ceiling 1,500 broken clouds, 8,000 overcast, 2½ miles visibility, rain showers, smoke. The official investigation has not as yet revealed whether this report was available or requested and received by the pilot from any of the stations passed close-in to New York. Last previous LGA report gave: 1225E scattered clouds at 1,500 estimated 8,000 overcast, 3 miles visibility, light rain showers, smoke. Newark at 1228E was reporting a 3,000 ft. ceiling with 2 miles visibility and Teterboro, 4,000 ft. ceiling, 800′ scattered clouds with 3 miles visibility.

Although no evidence as yet released indicates that the aircraft was under Air Traffic Control jurisdiction, it is known that instrument approach procedures were in effect at the time at LGA and any request for VFR approach would probably have been denied with the suggestion that the pilot convert his operation to IFR rules and execute an approved IFR approach procedure, in appropriate sequence at a specified approach time.

Unofficial reports garnered by the police from eye-witnesses indicate that the pilot was on an easterly course in drizzle and fog and swerved just prior to hitting the tower, indicating he saw the tower too late to avoid it. The height of the point of collision was roughly 200′ below the top or about 1200-1300 ft. msl. The instrument minimum altitude at this point is published as 2500 ft. msl.

There are conflicting reports about the tower's "automatic" obstruction lights. Eye witnesses *after* the accident reported that the lights were not on prior to the collision which might have shorted the light circuit anyway. The WOR-TV watchman reported that they "came on 5-10 minutes prior—" suggesting the use of a light-sensitive electric eye device rather than a sunset-sunrise time clock device.

Ironic, although not pertinent to the primary question of whether or not the pilot was attempting visual flight in IFR conditions at the time and point of collision, is the information that the local community had tried unsuccessfully a year ago to have the unused tower (WOR-TV had previously moved to the Empire State Bldg. in N.Y.C.) removed, as both an aerial and high-wind-plus-deterioration hazard!

The tower was the principal obstruction on a popular VFR route into LGA from the west, pointing as it did, directly across the center of N. Y.'s Central Park midway between the tall midtown buildings and those at Columbia (University) Heights. Oft-forgotten and in theory superseded by CAR VFR minimum altitude rules, is the N.Y.C. ban on flight over Manhattan below 2500 feet.

Business Aviation Boosts Jato

The use of Jato rockets for business aircraft is becoming more and more widespread, and a list of the corporations which have installed Jato on their aircraft for high altitude take-off or emergency in-flight boost is a veritable Who's Who of American Business. Included among these firms are Esso, Fruehauf, Gamble-Skogmo, Gulf Oil, Kearney & Trecker, Kudner Agency, Lawrence Warehouse, Line Material, M&G, National Distillers, Northern Ordnance, Olin Mathieson, Rockwell, Service Pipeline, Socony-Mobil, and Timkin & Zollner.

Installations to date cover a variety of aircraft, including a Convair 240, Douglas DC-3, Howard Super Ventura, and North American B-25. Aircraft of these and several other types are being equipped at a constantly increasing rate, with about 80 more installations presently scheduled.

Among the single engine and light twin engine aircraft owners, great interest is developing in the 15NS-250 "Junior Jato" installation which is now under development.

Ten first-line distribution or modification organizations constitute the present Jato distribution: Aero Corp., Atlanta; AiResearch Aviation Service, Los Angeles; Dallas Aero Service, Dallas; General Aircraft Supply, Detroit; Howard Aero, San Antonio; Lund Aviation, New York and Montreal; Northwestern Aeronautical, St. Paul; Remmert-Werner, St. Louis; and Spartan Aircraft, Tulsa.

TAYLORCRAFT SEABIRD *is the latest in a series of Taylorcraft planes with a molded fiber glass fuselage on a tubular steel frame. Fiber glass is tougher and lighter than steel, will not bend. The four-place "Seabird" has a 225 hp engine, cruises at 130 mph, has CAA approved gross weight of 3040 pounds.*

administration

"Administration" of one of a fleet of business aircraft is a big job. This department will report on the problems of the operator, such as:

Rules and regulations

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Forms used for flight and ground records

Dispatch and utilization

All readers will benefit greatly from a free exchange of administration methods. Address your ideas to Administration Coordinator, SKYWAYS for Business, 122 East 42nd Street, New York 17.

New Member of NBAA Washington Staff

Richard W. Groux has been appointed Assistant to William K. Lawton, Executive Director of the National Business Aircraft Association.

Mr. Groux recently was graduated from the Squadron Officers School at the Air University, Maxwell Field, Alabama, ranking second in a class of 588. He is a Captain in the Air Force Reserve and is on flying status, holding a commercial pilot's certificate with single, multi-engine and instrument ratings.

A graduate of Fordham University, Mr. Groux attended the Law School at New York University and was later associated with an investment banking concern in New York City.

Selection of Mr. Groux as Mr. Lawton's Assistant is part of NBAA's program of expansion which is expected, within the next year, to lead to the establishment of regional NBAA representation throughout the United States.

New Edition of Digest of N.Y. State Aviation Laws Available Free

Announcement has been made by the Aviation Bureau of the N.Y. State Dept. of Commerce of the availability of the 5th edition of the *Digest for New York State Laws Affecting Aviation.* Distribution of the 22-page booklet was scheduled for early November. Copies are available on request, without charge.

"This compact digest, designed for convenient references, summarizes the essential features of New York State laws affecting aircraft flight rules, establishment of public airports and the operation and maintenance of airports," said Edward T. Dickinson, State Commerce Commissioner. "The Bureau of Aviation in the Department of Commerce presents this material as a useful service to aircraft owners and pilots and also to airport owners and operators within New York State. This pamphlet is not a work of legal reference and does not attempt to set forth all statutory provisions relating to aviation. Persons desiring further study of specific laws of particular interest will find the pertinent sections cited for their convenience."

The booklet is divided into five parts, the first of which is devoted to the powers and responsibilities of the Commerce Department.

Part II concerns operation of aircraft, licensing, and air traffic rules. Part III concerns establishment of public airports, equipment, maintenance, operation, zoning and kindred angles.

Part IV covers a variety of topics including absentee voting privileges of airline employees, crimes and misdemeanors, liquor and narcotics, firearms, and criminal jurisdiction. Part V is devoted to seaplane bases.

The 5th edition of the *Digest* contains all revisions or enactments of laws affecting aviation by the 1956 session of the State Legislature.

CAA Graduates Largest Class In Air Traffic Control

A group of 230 trainees, largest class in history, recently completed an 8-week training course in air traffic control at the CAA's Aeronautical Center in Oklahoma City, and are on their way to assignments at air traffic control facilities.

James T. Pyle, Acting Administrator of CAA, said that the class, which was graduated last November 30th, are the first of 1400 to be trained in air traffic control by next June 30th, as part of the agency's program of expanding and improving traffic control services.

In air route traffic centers the graduates will perform assistant controller duties under actual control conditions. In addition they will receive further classroom and practical training. Those assigned to airport traffic control towers will understudy controllers at the various conrtol positions under actual and under simulated conditions.

It requires about 18 months as an assistant to qualify as a controller in both traffic control towers and air route centers. Vacancies exist in CAA control facilities in all parts of the country and in Alaska and Hawaii. Entrance grade for trainees is GS-6, $4080 per year, with an increase to GS-7, $4525, after six months if the trainee meets Civil Service requirements.

In order to qualify for training as a controller, the applicant must have had experience in one of the following fields: airplane pilot, military air traffic control, aircraft dispatcher, air/ground communicator or in flight operations.

Detailed information may be obtained from any CAA control facility, from CAA Regional offices, and from U.S. Civil Service Commission offices.

October Production and Export Statistics for Business Aviation

Shipment during October of 440 1- to 10-place utility and executive aircraft by six U.S. manufacturers was announced by Joseph T. Geuting, Jr., Manager of the Utility Airplane Council, AIA.

Included in the shipments were 395 planes of 4-place or more, and 45 1- and 2-place aircraft, with a total dollar value of $7,725,000 figured at the manufacturers' net billing price. During September, seven companies reported shipment of 563 aircraft of this type, valued at $8,593,000.

Exports of civil aircraft weighing 6000 pounds or less during October 1956 registered a 59% gain in unit shipments and a 66% gain in value over October 1955, according to Irving H. Taylor, AIA's Export Director.

Five U.S. manufacturers sold 92 aircraft, valued at $1,127,325 to 26 foreign countries and Alaska and Puerto Rico. During October 1955, 58 aircraft valued at $679,134 were shipped abroad.

The growing demand for U.S.-built aircraft by the free countries of the world is reflected in the increase in exports of planes in this class for the first 10 months of 1956, as compared with the same period for 1955. Total shipments for the first 10 months of 1956 amounted to 774 aircraft valued at $10,047,799. For the same period during 1955, total exports amounted to 555 units valued at $6,788,905.

The largest number of planes went to Mexico (12); next was Argentina (11), New Zealand (9), Colombia and Union of South Africa (6 each.).

Companies contributing statistics included Aero Design and Engrg. Co., Beech Aircraft Corp., Callair, Cessna Aircraft Co., Mooney Aircraft, Inc., Piper Aircraft Corp., Taylorcraft, Inc.

PILOT *William Firstin at the controls of Empire Steel's new six-place Aero Commander.*

Success of Company's First Business Plane Prompts Purchase of Another

Encouraged by the success with which their first single-engine business plane helped to develop markets far beyond their original sphere of operations, Empire Steel Castings, Inc., of Reading, Pa., has purchased an Aero Commander to assure itself of more of the same kind of progress with greater capacity, speed and safety.

Addition of the Commander keeps intact Empire's record of being the only foundry in the east to operate its own aircraft. The first plane was purchased in March, 1954, and within 28 months Empire Pilot William J. Firstin flew 486,855 passenger air miles. This plane extended Empire's business into new markets in New England, the South and the distant Southwest.

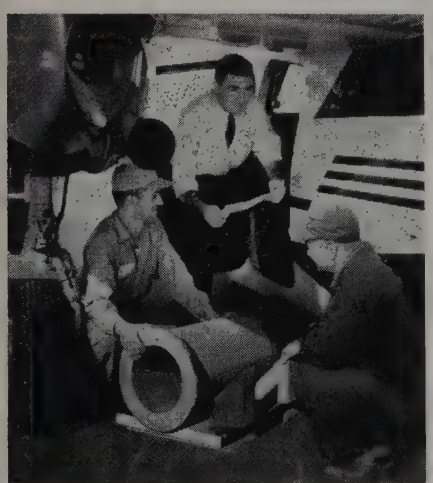
Company President McCormick G. Moore predicts that the new Commander will, like the plane it replaces, continue to help the foundry to broaden its sales market, offer better service to its customers, and provide safe and dependable transportation.

The new six-place Commander, with a range of 1200 miles, will be used to fly customers and prospective customers to and from the Empire plant for consulting and educational purposes. It will give users of castings a chance to inspect the firm's facilities and methods, while also providing additional means of settling special engineering problems on difficult jobs.

On special rush orders, the plane will carry up to 1500 pounds of steel castings instead of passengers, and will operate all over the eastern seaboard.

For safe all-weather operation, the Empire Commander is equipped with ARC instrument landing equipment, Lear L-2 autopilot and altitude control, Lear LVTR 56-channel VFH transceiver, LVTR-6 ILS and VOR receiver and a 10-channel transmitter incorporating a low-frequency and commercial band radio receiver, Lear ADF-14-C, and 75 mc Z-marker receiver.

Bill Firstin, who remains with Empire as Chief Pilot, is enthusiastic about the new plane. "From the standpoint of safety and practical use," he said, "this plane is just what we want. It can operate from short undeveloped fields in isolated areas as well as it can from large airports. It will fly through a great variety of weather conditions. This is important to us because the weather in our operating area ranges from subfreezing to semitropical, depending on the season and location."



EMERGENCY *cargo, a 398-lb. casting, to be carried in the Commander.*

New NBAA Members

(*Continued from page 4*)

Fla. NBAA Rep.: David M. Benson, Chief Pilot and Dir. of Operations.

Grumman Aircraft Engrg. Corp., Bethpage, N.Y. NBAA Rep.: Henry J. Schiebel, Jr., Commercial Aircraft Sales Manager.

Lockheed Aircraft Corp., Box 551, Burbank, Cal. NBAA Rep.: Frank F. Davis, Corporate Commercial Sales.

Newark Air Service, Inc., Hangar #12, Newark Airport, Newark, N.J. NBAA Rep.: C. William Drake, Executive Vice Pres.

Schine Hotels, 120 24th St., Miami Beach, Fla. NBAA Rep.: G. David Schine, President.

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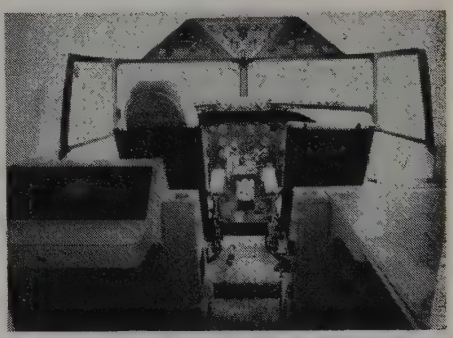
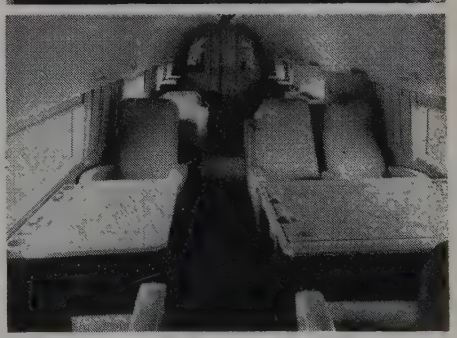
The breath-taking beauty of the interior of conversion number 107 presents the finest in luxurious, yet efficient, executive aircraft. From the cockpit forward, completely equipped with the latest in radio and navigational radar, all the way back through the comfortable, beautiful cabin . . . past the sleeper couches, the luxury lounge seats, the fully-equipped galley amidships, all the way to the rear . . . this DC-3 for an old satisfied customer is a fine example of what skill, experience and high-quality workmanship can do. Satisfied customers are our best recommendation.

conversion #107





L. V. EMERY, President

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Channel-Wing Business Plane Scheduled to Appear in 1957

The Custer Channel Wing Corp. has announced that the CCW-2, a two-place craft capable of in-flight speeds from 5 to 200 mph, will be ready for test flight by mid-1957.

Designer Willard R. Custer said that the prototype will be powered by a 240 hp engine designed to give a 4000 fpm rate of climb and to clear a 50-foot obstacle in 300 feet. The most unorthodox feature of the Custer plane is the channel configuration of the wing, a half-barrel shape of approximately the same diameter of the propeller, and in the CCW-2 located just forward of the pusher propeller. In operation, the propeller is said to create lift with almost no forward movement by pulling great volumes of air across this semicircular section of the airfoil.

The first model will be suitable for business flying. A second model, intended to operate without runways, will be designed for crop dusting and spraying.

PAC Buys Learcraft Conversions

Pacific Airmotive Corp. and Lear, Inc., have announced an agreement whereby PAC will own 100% of the stock of Learcraft Conversions, Inc. Assets of Learcraft Conversions include the former Aircraft Engineering Div. at Santa Monica airport.

The agreement, retroactive to Nov. 1, 1956, was jointly announced by John W. Myers, President of PAC, and Richard M. Mock, Lear President.

Foremost modification and service center for Lockheed Lodestar aircraft, Learcraft Conversions and the Aircraft Engineering Division of Lear engineered and are manufacturing Mark I and Mark II Learstar executive planes. Modification, maintenance and overhaul of Douglas DC-3, Convair 340, Beech D-18 and Aero Commander are also performed, and will be continued without interruption.

The former Lear subsidiary specializes in advanced research in aerodynamics, stabilization, aircraft structures, flight control, and aircraft performance.

Effective immediately, the former Lear subsidiary will be known as PacAero Engineering Corporation, and will operate as a completely separate corporation, according to Mr. Myers. Vernon B. Benfer, former General Manager for the Lear division, has been named president of PacAero.

PacAero has 75,000 square feet of hangar space and 170,000 square feet of ramp area on Santa Monica airport, and is equipped to accommodate planes up to and including the DC-7 and Super Constellation.

Air Cargo to be Surveyed in Govt. Census of Transportation

A survey of air cargo commodity movements is part of a new program for a Census of Transportation, designed to bridge serious gaps in presently available statistics on a major expense item in production, recommended by Louis S. Rothschild, Under Secretary of Commerce for Transportation, in a report submitted by him to Secretary of Commerce Sinclair Weeks.

In addition to air cargo commodity movements, the surveys, to be undertaken by the Bureau of the Census, would cover commodity distribution by land, air and water transportation, passenger movements by land, air and water, and bus and truck utilization.

The five surveys will obtain statistical information which, in combination with presently available statistics, will provide greatly improved transportation data, essential to national commerce.

Pardon Us—A Correction

On page 34 of the December SKYWAYS we said the Mrs. Marian Higdon received the Business Flight Safety Award from Herb Fisher. Actually, Mrs. Higdon received the award for Mr. Stonecipher.

STANDARD FACTORS CORPORATION

Announces its

NEW PURCHASE LEASEBACK FINANCING

Features:

1. **Acquisition of new aircraft.**
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You can, if you wish, initiate a continuous replacement program by selling your old aircraft and acquiring new. Standard will finance the sale of the older equipment to other airlines on a "pay out of profits" plan, and finance the purchase of your new equipment for you on a leaseback arrangement or under a conditional sales contract.

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Featherweight Champ!

ARC's ADF weighs less than 20 lbs!

Why carry dead weight? Why excess bulk?

This Automatic Direction Finder offers accuracy and reliability proved in more than two years of testing – yet the entire 5-unit system weighs only 19.7 pounds. Now you can have a DUAL installation where required – at a weight saving of 80 pounds or more.

The ADF still is the world's Number One navigational aid, usable on an estimated 60,000 radio stations. Now you can have ADF featuring ARC standards of performance and reliability. This system incorporates hermetic sealing of critical components such as the entire loop assembly. It also has other mechanical features designed and tested for dependability under today's higher speeds and more exacting operational and environmental conditions.

The Type 21 ADF covers all frequencies from 190 kc to 1750 kc. It requires less power – only 2.8 amps at 27.5 volts dc input. Extremely low drag of the loop is an outstanding feature. Housing extends only 2 inches from the skin of the aircraft.

Now make room for more payload and other equipment. Fly with ARC-reliability, less weight, less space, less drag. Ask your dealer for complete details.

TYPE 21 ADF WEIGHS ONLY 19.7 POUNDS

Component Units Weights: Receiver, 6.8 lbs.; Loop, 4.3 lbs.; Loop Housing, 0.5 lbs.; Control Unit, 1.6 lbs.; Indicator, 1.3 lbs.; Power Unit, 5.2 lbs.;
CAA Type Certificated

Dependable Airborne Electronic Equipment Since 1928

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navicom

Devoted to information regarding the operation of business aircraft from first scheduling through flight completion, and the factors bearing on those operations, such as facilities, equipment, problems of navigation and communications, airspace regulations, new ATC procedures and new flying techniques. Comments and suggestions are invited.

Bendix Announces Airway Navigation By "Dialing"

Concurrent with the Air Force announcement of initial flight of the B-58 "Hustler," the world's first supersonic bomber, from Convair's Fort Worth airport; Bendix Aviation Corp. of Baltimore, announces that the delta-winged aircraft is guided by a packaged electronic navigation system, called the Civil Navigation Aids System.

Although further details were not released, of interest to civil pilots is the future possibilities for easier airways flight. The System shows the accurate location of the aircraft, enabling safe flight and landing under all weather conditions.

During cross-country flights, the Civil Navigational Aids System displays the unseen electronic air "highways" that streak the nation. The pilot merely "dials" the airway he wants to fly, and the system guides the plane along this airway.

When landing, the Civil Navigational Aids System becomes a precision approach guide, indicating the correct approach path to the runway and the bomber's height as it descends to the runway. When the bomber is miles from the runway, the System through visible means marks the correct approach to land the plane.

Subminiaturized parts and components had to be used to make the Civil Navigational Aids package small enough to fit into the B-58 bomber. Also, because of the forces applied by the bomber's unusual acceleration, the device had to be designed without vibration shock mounts of any kind. Other problems included high altitude and temperature environment.

When used either as a cross-country guide or landing approach device, the Civil Navigational Aids may be tied directly to the Hustler's automatic pilot for safe flight without human aid.

TACAN Development Reviewed

At the annual dinner of the Narco Distributor's Meeting in Philadelphia recently the principal dinner speaker was Mr. Sven Doddington, Director of Air Navigation, Federal Telecommunications Laboratories, Nutley, N. J. Mr. Doddington is one of the key men in the development of TACAN, whose distance measuring capabilities will be used with VOR in place of the previously agreed-upon DME equipment, made by Narco and others.

Mr. Doddington was introduced by Gil Quinby who pointed out that with the VORTAC decision "there is no more controversy, now we are going ahead." Mr. Doddington, on his part, felt that Federal did not represent competition to the Narco organization since "we have never sold a 'black box' for civilian use."

As to the implementation of TACAN he said rapid progress could be expected now that the VORTAC decision has been made. Although no formal system characteristic or equipment standards exist for civilian use of TACAN Distance, these are being prepared. The CAA is beginning an evaluation of the first prototype VORTAC ground station at Phillipsburg, Pa. "The actual rate of build-up of VORTAC stations," Doddington said, "will depend on appropriations and, I'm afraid, on politics."

Transland Ag-2, New for Agriculture, Forestry

The Transland Co. of Torrance, Cal., has entered the fast-growing field of agricultural aviation with the Ag-2 monoplane.

Described as "the world's first airplane to be designed specifically for aerial application of agricultural and forest lands," the all-metal Ag-2 can be used for seeding operations and fighting forest fires as well as for all phases of dusting and spraying of crops.

The Ag-2 features separate dispensing systems, one for solids and the other for liquids. Both systems can be controlled single or together by the pilot in the cockpit. The liquid-tight 53 cubic foot hopper will hold 2000 pounds of low-density solids, and is integral with the fuselage, located aft of the engine and forward of the cockpit. Four tanks for liquids, with a total capacity of 250 U.S. gallons, are located in the wings, readily accessible from the ground for filling and maintenance. Other equipment includes agitator gate, spreader, engine-driven pump, valves and spray booms.

Vulnerable parts of the frame and fuselage are protected from chemical corrosion by a special "Catalytic" paint, and the cockpit, which offers good visibility, is especially designed to seal out chemical dust and fumes.

The Ag-2 airfoil is NACA 64021, a very thick plane, fitted with full flaps, which provides about twice the lift of conventional airfoils. The Ag-2 will fly at 80 mph with full load with flaps down using 58% power. On its maiden flight, test pilot Robert Masterson took off in less than 400 feet at 4033 pounds, and climbed on normal rated power at 1400 fpm. The engine is 450 hp Pratt & Whitney.

The Ag-2 is a development of the Ag-1, an experimental plane built at Texas A & M under the direction of Fred E. Weick and with the assistance and sponsorship of the CAA, Department of Agriculture and the National Flying Farmers Association.

G.E. Shoots Transistors From Guns in Test of Reliability

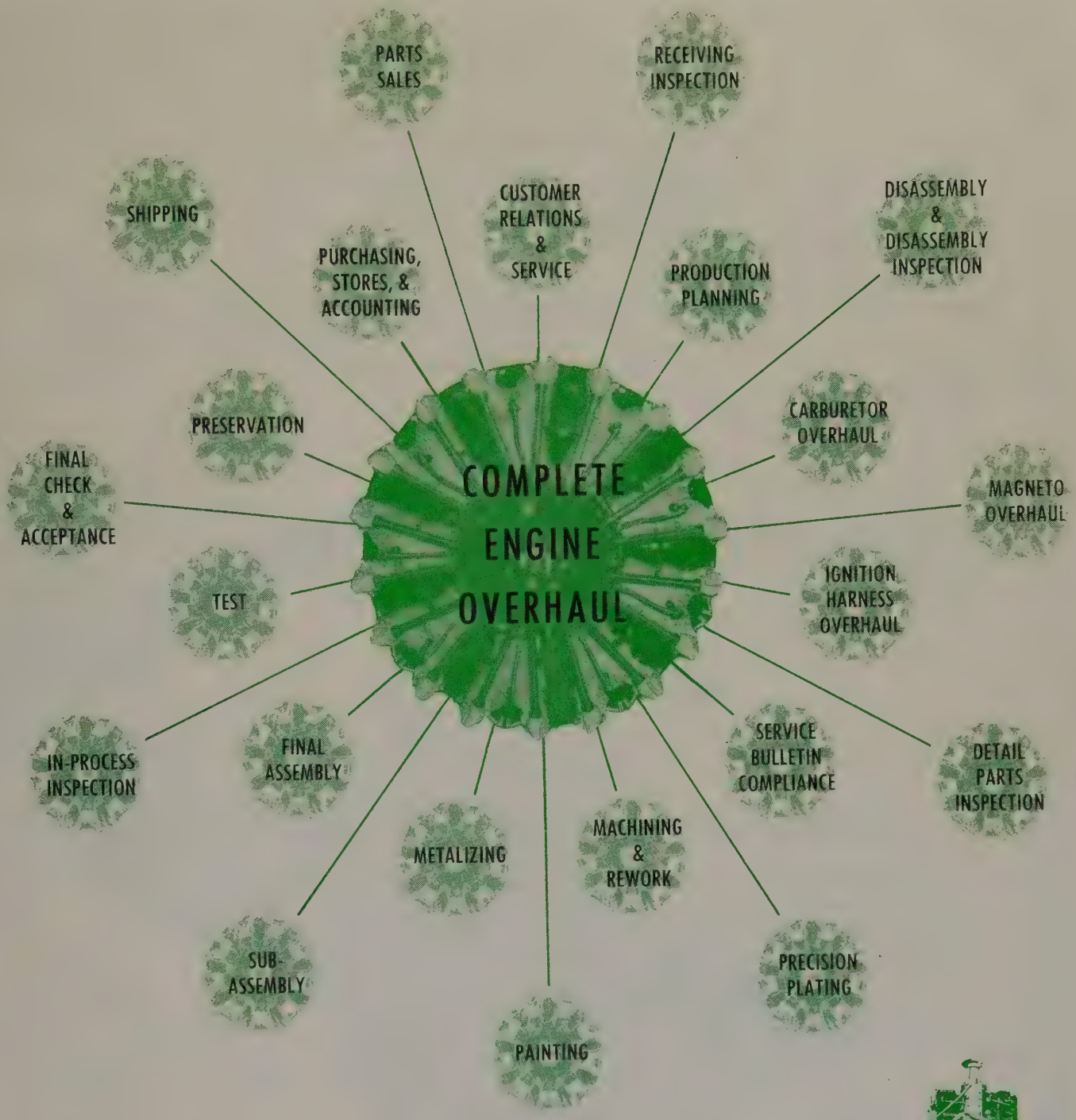
In an address to a transistor reliability symposium, C. H. Zierdt, engineering consultant in the Semiconductor Products Dept. of General Electric, said that tests run by the company indicate that transistors used in electronic equipment may never have to be replaced if they are used within the limits set by the manufacturer.

Mr. Zierdt reported that life tests started in 1954 on transistors picked at random from regular manufacturing lots show no failure after 18,000 working hours at full power, the equivalent of six years of operation eight hours daily. He further stated that it is impossible to tell if the transistors will ever fail, because they look and act like new units. After operating at peak ratings for 1000 hours, 99¾ per cent of a second test batch of 2050 transistors showed no signs of wear.

Other tests were described which involved shooting transistors from a mortar, and exposure to high temperature and nuclear radiation.

The shock of being fired from a mortar is equivalent to 8000 g's, and 60 to 75% of the transistors so tested were still capable of operating at full power.

Mr. Zierdt reported that transistors are capable of withstanding "substantial doses" of nuclear radiation; germanium transistors, he said, will operate at 212° F., and will withstand 275° F. in storage.



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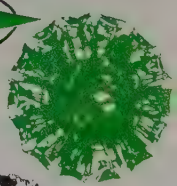

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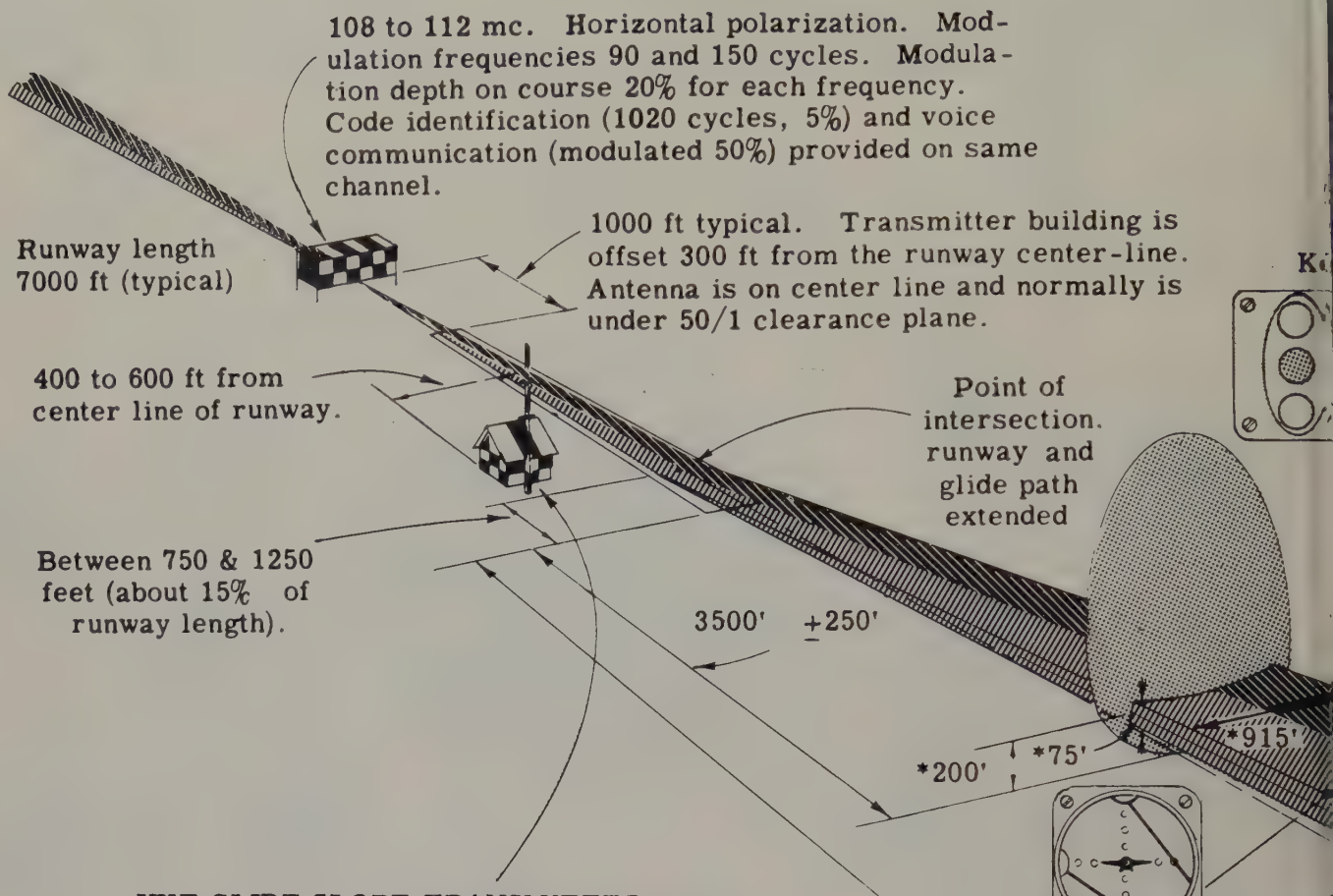
VHF RUNWAY LOCALIZER


108 to 112 mc. Horizontal polarization. Modulation frequencies 90 and 150 cycles. Modulation depth on course 20% for each frequency. Code identification (1020 cycles, 5%) and voice communication (modulated 50%) provided on same channel.
Runway length 7000 ft (typical)
1000 ft typical. Transmitter building is offset 300 ft from the runway center-line. Antenna is on center line and normally is under 50/1 clearance plane.
400 to 600 ft from center line of runway.
Point of intersection. runway and glide path extended
Between 750 & 1250 feet (about 15% of runway length).
3500' ±250'
*915'
*200'
*75'
b y
90 cps
Glid
modulatio
*5 miles (typical)
Outer
from
slope
(min
vertic

UHF GLIDE SLOPE TRANSMITTER

328.6 to 335.4 mc. Horizontal polarization, modulation frequencies are 90 & 150 cycles, each of which modulates the carrier 47.5% on path. The glide slope is established at an angle between $2\frac{1}{4}$ and 3 degrees, depending on local terrain.

RATE OF DESCENT CHART

(Feet per minute)

Speed (knots)	Angle $2\frac{1}{4}°$	$2\frac{1}{2}°$	$2\frac{3}{4}°$	3°
90	355	400	440	475
110	435	485	535	585
130	515	575	630	690
150	595	665	730	795

NOTE:

Compass locators in the 200 to 415 kc band are installed at most outer and middle markers. A 1020 cycle tone, modulating the carrier about 95%, is keyed with the first two letters of the ILS identification on the outer locator and the last two letters on the middle locator.

* Fig
sup
are

U. S. DEPARTMENT OF COMMERCE, Civil Aeronautics Administration. Originally prepared

ILS

(CAA Instrument Landing System)

STANDARD CHARACTERISTICS AND TERMINOLOGY

ILS approach charts should be consulted to obtain variations of individual systems.

IDDLE MARKER

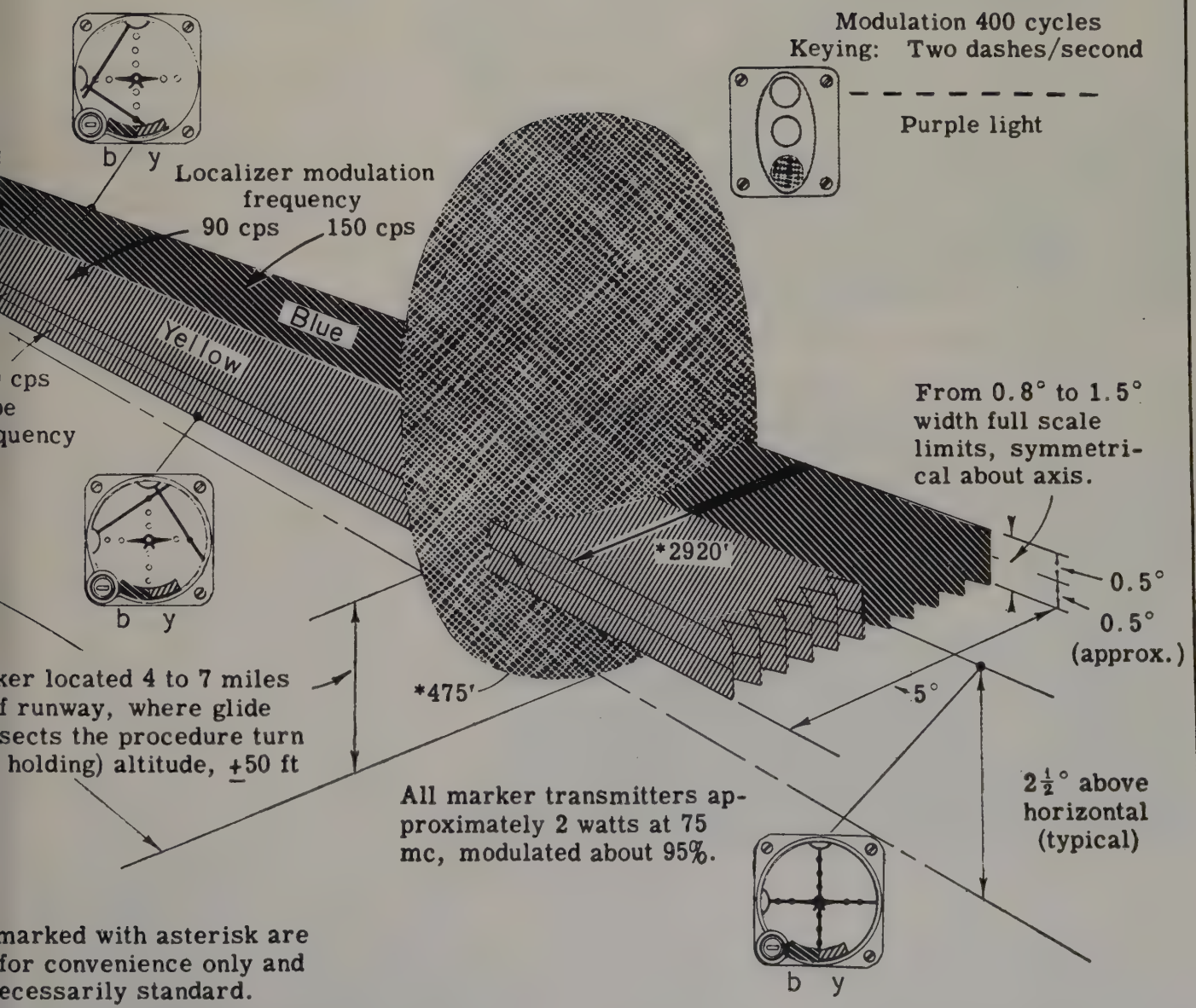
ılation 1300 cycles
Alternate dot & dash

Amber light

OUTER MARKER

Modulation 400 cycles
Keying: Two dashes/second

Purple light



marked with asterisk are
for convenience only and
ecessarily standard.

Transport Association of America, May 1947 — Revised by Civil Aeronautics Administration, June 1956

ATC Panel

(*Continued from page* 12)

position reporting, which has been a problem for all of us. There are too many position reports.

"However, we cannot simply say to the CAA, 'Cut out some position reports,' because that doesn't work, although they do have an active campaign on it. There are many position reports on a given flight route that actually aren't needed for that route but which are needed for aircraft crossing that route on other crossing airways.

"Our proposal, at the moment, is to cut out the position report on the airways where it is not needed and to establish what might be called a directional position report, which would be required when you are on the crossing airway, but which could be indicated as not required when you are on the other airway.

"I will grant that this doesn't go far toward simplification, and we are all trying to simplify things.

Morrow: "Thank you."

Member of the Audience: "Sam Freeman, NATA. We are talking principally about IFR instrument control today, but in NATA we have another problem which certainly ties into traffic control.

"We have the VFR problem, and I would like to hear a little discussion of that. Speaking for NATA we have one or two suggestions. One I think we all realize, is that the ANC standards of separation definitely should come in for some revision to give the tower a little more control about planes coming in on the runways, one behind another.

"Another thing, if the runway is closed with a tractor or something working on it, and a plane wants to come in on that runway, I think he should be able to do it.

"On that radio thing, I think something could be done along the lines that the Army did during the war and that is have a definite monitor.

"In other words, if the man talks too long on these conversations, this could be called to his attention later on. I remember I got into a lot of trouble in Italy once for using poor radio procedure. This was a security deal to some extent, but I believe that we could approach it if the pilots knew that their conversations were being monitored, and if they talked too long or used the wrong procedure, that somebody could come back on them later about it.

"And another thing I would like to have discussed on two counts—one, V.F.R. and the other, I.F.R.—is raising the floor of our airways. I don't see any necessity for airline airplanes coming through at say 2,000 feet where some of our light planes are milling around. We have had two close near misses with DC-6's and with other large airplanes as low as 1500 feet, 30 miles out from LaGuardia. They do not have to come down that low that far out.

"And getting back to VFR, I would like to have some comments on it. We fancy these VFR approaches, that is, some or less VFR, in the high density areas, such as New York. At the present time, when VFR is down at three or four miles visibility and you call Idlewild or La Guardia or Newark and ask for help from the radar people, it is hard to get communications; that is the first problem. And in the second place if you get them, then they will tell you either, 'Remain VFR,' which is a big help when you cannot do it, or they will indicate that they have no control over you because you have not filed IFR and they have no responsibility for you."

Morrow: "I think you have hit upon a very critical point: operational requirements. Max, you are selected as the man to answer this question."

Max Karant: "I have listened to people arguing a lot over the IFR operations because this seems to be the biggest thing in the world, although about 20 per cent of all the planes sooner or later will get around to VFR, which is something like 80 per cent of the time.

"I think practically everyone in all segments of aviation has agreed on speed control. The Civil Aeronautics Board has plans to establish speed control in high density zones.

"There is one thing that disturbs me about this operation in the safe speed control we had in the Washington experimental zone. It excludes one type of aeroplane that was causing us so much trouble. The rule says that the speed limit is 180 miles an hour except for those aeroplanes that can't do it.

"Well, this is not much of a safety device. I don't know what to do about

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Embry-Riddle School of Aviation, Miami 30, Fla.
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City.....State.....

(for students only) age..... (check one) vet ☐ non-vet ☐

it. It depends on what size of military aircraft you are talking about; some say they can't slow down and some say they can. This is a problem.

"On the communications once again, we must agree with everybody. On a bright sunny day—talking about New York,—I don't know how I can get through that area because I can't talk to anybody.

"Incidentally, I thought there were tape recordings being made of most of these frequencies."

Member of the Panel: "That is correct."

Karant: "As a matter of fact, I don't know what they do with all the tape recordings or if they ever use them.

Beuter: "All of the air frequencies are recorded and Aviation Safety uses that evidence in violations and alleged violations."

Capt. Jensen: "In answer to Mr. Freeman's question I would like to explain why our airline aircraft sometimes fly at low altitudes. I know there are times that I have flown from New York to Washington at around 2,000 feet VFR. I don't recall having done it at 1500 feet. In some cases I have done it for my passengers' benefit and tried to get them where they want to go to make connections without being inflicted with the delays of the IFR system.

"I tried to stay at 1800 because of the weather conditions, but I am willing to bet that on the occasion that Mr. Freeman was talking about, there was probably no weather there, which would probably undercut my whole statement.

"I do know that there is a lot of misconception about the altitudes at which the aeroplanes fly because the committees at Washington say, 'We are going to stratify the air space with regards to speed and all the high speed aircraft are going to be flying at high altitudes and all low speed at low altitudes.'

"I got on a DC-7 to go to a meeting at Denver. We were up there and the M.E.A. pushed us out at around 6,000 feet, I believe, and it was because the wind conditions were such that that was the proper place to fly the aeroplane. So let's not confuse ourselves by thinking that all of the high speed aircraft are always going to be up at the higher altitudes. I think there are cases when we can fly higher and keep out of other peoples way. And I think we are trying to become more and more aware of these things. We are all certainly flying in the same air space and I think we have got to work these things out as pilots together, and do the thing that should be done, and that means getting up higher. But we must have the facilities to do it. We must have the circumstances to do it and we must make the decisions to do it.

"As far as speed control is concerned, Max has properly stated that the airlines go along with speed control. However, they have spent lots of money, as your companies do, to provide high speed aircraft. They buy those to save time and it costs heavily to buy those aircraft and, therefore, they do not want the speed control to get out of hand to the point where the speed control zone for New York will stretch out to Washington and they are constantly flying at 155 knots.

"Certainly we could use good judgment in cases around airports and all that we want is common sense."

Morrow: "Thank you. We have talked about some of the speed controls on rockets, jets and so forth. I would like to have Major Sadek comment on some of the traffic control problems. We mentioned speed control. Is that a critical factor in traffic control of jets? When we get into this jet age, are we going to have traffic control problems with jets? Why don't you tell us some of your traffic control problems with jets that we will have to live with."

Major Sadek: "Offhand, I would say that one of the larger items to consider, is not speed control but rate of climb and rate of descent. Many of our aircraft now can climb or descend in excess of 20,000 feet a minute. Now, speed control does have its advantages, of course. It has got to be tempered though because all aircraft, again technical, cannot be safely maneuvered below about 250 knots.

"Although I am not qualified in the aircraft, I believe that some of them in a 30° bank, at low altitude, we begin to get stall indications at about 275 knots.

"So you see some of our problems. We try to slow down. This will help the situation somewhat, but when we climb, we climb very rapidly and we must descend in a hurry, otherwise we would

(*Continued on page* 36)

ALL THE COMFORTS OF HOME . .

All the Comforts of Home combined with all of the essentials of a flying office were incorporated in the interior of this Lockheed Lodestar recently completed by Dallas Aero Service. Custom interiors, complete in every detail, are available for all types of executive, private and business aircraft at Dallas Aero Service. For originality, fine workmanship and full satisfaction, it's Dallas Aero Service.

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Squawks

"On October 26, 1956, I filed an IFR flight plan, estimating 16:00 departure, and requesting Cincinnati to Springfield direct DCA 9000 feet. We requested our clearance at 16:00. About twenty minutes later, a clearance was given us to climb and cruise 14,000 feet.

"You can imagine my surprise at receiving such a clearance for a DC3. After refusing it and challenging the reason for 14,000 feet, I waited ten minutes and got an excuse that Washington Center had restricted all traffic into the Washington area below 14,000 feet. Since there were several aircraft that had been waiting at Lunken as much as an hour for instrument clearances, I cancelled by flight and arranged transportation for my passengers back to their homes.

"I then requested clearance to New York to pick up other passengers, and after a thirty minute delay the Lunken Tower advised me by phone that New York had restricted all altitudes below 13,000 feet into the area. Therefore, both of my flights were cancelled.

"Again on October 31, 1956, I requested an IFR clearance from Milwaukee to Cincinnati, and after twenty minutes delay was given a clearance for my route but to maintain 1000 feet on top. Because of cloud heights, this was impossible, so I asked why we couldn't get an altitude and was advised that Chicago was not accepting aircraft at any altitude other than 1000 feet on top. I cancelled the flight plan, and went VFR as far as Chicago, where I could not proceed further VFR. After holding over Midway 40 minutes, I got an IFR clearance to Cincinnati.

"Cases like these are becoming more numerous. A large number of professional executive pilots have their jobs in jeopardy, and business flying is suffering, because too many trips are being cancelled unnecessarily.

"Page 49 of November SKYWAYS carries an item about a pilot who was forced to take a CAA proficiency check because he couldn't locate holding fix assigned to him in the Detroit area while IFR. Although I am not familiar with this particular case, I can sympathize with him, as I had the same trouble in the Detroit area last winter by having a fix assigned to me that was not on the charts. We are frequently requested to hold on a fix using a radial that is as much as 50-75 miles from an omni station. We all know there is no radio equipment built yet that will give an accurate fix at that distance, but none the less must frequently hold at such spots with other aircraft in close proximity. I will cite, for example, Vineyard, White Cap, Hamburg, Sanger, and Amboy, in the New York area.

"In connection with this question of quality of radio equipment, ATC would be considerably improved if it would require better diction from some of its controllers, and then give them the equipment to transmit properly, so a clearance can be understood the first time. My DC3 has the latest, VHF transmitters and receivers available, but when I go into LaGuardia it is frequently almost impossible to distinguish the muddy syllables of some of the controllers, much less as quickly and immediately as that area needs for safety.

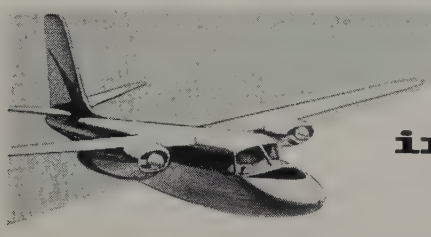
"It is the avowed function and intention of the CAA to make flying safer, but these traffic problems have existed for the last five years, and have been getting steadily, and dangerously, worse. The percentage increase in volume hardly justifies the breakdown point now upon us. I don't know if the cut in CAA appropriations ever balanced the Department of Commerce's budget, but this current foul up seems to be an expensive way to do it.

"I am earning a living as a professional executive pilot, flying the most modern equipment available, but it seems the more we try to keep abreast of modern techniques, and the more we spend for electronics, the more we are bogged down with antiquated procedures, politics, and budgets."

Sincerely, R. O. Gragg, Chief Pilot, Federated Dept. Stores.

"Wm. Grundon flying a Beechcraft Bonanza for AMP Inc. of Harrisburg, Pennsylvania reports as follows:

"October 12, 1956. Today an incident happened which I feel should be recorded. I was cleared by EWR approach control to the O/M for a landing runway #4, to check two Slick C-46's coming up from New Brunswick. The first C-46 and I arrived at the O/M at the same time. I was cleared to follow the first C-46. I observed the other C-46 about five miles behind at this time. When I was about over the M/M with the C-46 about to clear the active runway, the tower advised



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me to make a 360° to the right. The C-46 behind me was inside the O/M by this time, and it was obvious he was following me too close. After I completed about 90° of the 360°, I was advised to Plan #3 to land behind an Allegheny Martin which was downwind over the bay. When I was about over the M/M on my second approach, and the Allegheny flight crossed the boundary, the tower cleared a United flight into position. When I was about to go around again the tower cleared the runway for me to land."

Wheel-Skis for Safe Flying All Year

Today, winter flying is almost routine to the average businessman-pilot, if he stays to the beaten path of metropolitan airports where runways are constantly plowed. However, many airports in minor cities and towns do not offer these facilities, and to the man who does not want to curtail his flying, aircraft skis are the answer.

The story of aircraft skis, their importance to business aviation, and the development of the original idea to accommodate an increasing variety of planes, told in terms of the world's largest builder of aircraft skis, makes an interesting highlight in the general picture of business flying progress.

The present generation of pilots may have difficulty recalling the name of Speed Holman, famous in the twenties for his daredevil flying. However, it was Holman's desire to continue flying after the rough midwest winter had set in that introduced the idea of aircraft skis. Holman communicated his desire to a friend, Frank Ditter, now president of Federal Ski & Engineering Corp., and the idea founded an industry.

The first aircraft skis were designed to replace the wheels for winter flying, which made it mandatory to take off and land on snow. With the modern multipurpose ski produced by Federal, the skis may be controlled hydraulically by the pilot.

In northern bush country flying, tremendous amounts of cargo are carried in ski-equipped planes. Without them, planes would be grounded seven months of the year.

The giant hydraulic skis recently completed for Lockheed P2V-7's are far removed from the stubby wooden creations used during the twenties. From those first wooden skis Federal progressed to aluminum and finally to the modern wheel-ski installations now used for small and large aircraft.

FEDERAL WHEEL SKIS *adapt this Cessna 180 to year-round utilization.*

F-1 Safari: Versatile New Transport

The Frye F-1 Safari, scheduled for test flight early in 1957, is a plane full of ideas, and represents a very carefully planned effort to supply aircraft operators with as large a degree of versatility as it is possible to incorporate into a single design.

Jack Frye, air transport veteran and former president of T.W.A. describes the F-1 as "the result of extensive optimization studies and investigation of customer requirements, aimed at achieving maximum safety, economy and utility in one basic airplane."

The basic Safari has a span of 109′ 6″, 1500 square feet of wing area, a fuselage 75′ 10″ long, and four 600 hp Pratt & Whitney engines.

For example, the F-1 Safari has four alternative interior arrangements, designed to adapt it to executive, aircargo, passenger or passenger-cargo service, and factory kits will be available for the conversion of any one configuration to any other. Removable furnishings may be used to create a luxurious executive interior in the big fuselage, and when not in use as executive transportation, the same Safari can be converted for the transportation of large groups of personnel or cargo.

As a freighter, the F-1 will carry a payload of more than 9000 pounds over a 1000-mile route, and up to 12,000 pounds on shorter flights. It is equipped with two truckbed-height loading hatches: a clamshell nose door 106″ wide and 75″ high, and a 76 x 75″ side door. The cargo compartment, 39′ 6″ long and 9′ 1″ wide, has a volume of 2513 cubic feet. A feature of the cargo version is the "Cargon" system of built-in rails and facilities for moving and locking palletized shipments. By using the wheeled pallets, the F-1 can be loaded and unloaded simultaneously, reducing turnaround time to ten minutes in some cases, and permitting cost reductions in handling of 50 to 70%.

The combination version uses modular units in the passenger compartment to permit expanding either the cargo or the passenger accommodations to suit particular requirements. In the full passenger conversion, optional windows in the nose give travelers a "pilot's eye view." Any one of the four versions can be equipped with either fixed or retractible landing gear.

The F-1 can also be equipped with Lycoming T53-L-1 turboprops, the 800 hp Wright R1300 Cyclone, or the 820 hp Alvis Leonides engine.

Powered by four P&W Wasps, a Safari carrying a 14,292 pound useful load will take off in 2300′ over a 50′ obstacle, and will land in 1700 feet over a 50′ obstacle. The F-1 will require an airport length at sea level, under CAA regulations, of 2800′.

Cruising speed of 171 mph at 8000 feet, a landing speed of 62 mph. Three-engine ceiling is 18,000 feet, two engines (on one side) of 9000 feet.

The all-cargo Safari, with fixed gear and Wasp engines, will be priced at $365,000; basic passenger version will cost approximately $395,000.

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maintenance

This department covers cost-cutting, time-saving methods and devices for maintaining industrial aircraft efficiency. Technical tips from engine, airframe, electronic, instrument and other components manufacturers, CAA and AD notices, and other sources will be covered. Readers are invited to share their individual mechanical "know-how" with SKYWAYS editors, that it may be disseminated to all operators interested in business flying.

New Mobile Unit Sprays Corrosion-Resistant Coating

A mobile dual-purpose unit which provides both spray and dip or fluidized application of corrosion resistant coating is announced by American Agile Corp.

Called the "Mark III," the mobile unit consists of a metal reservoir hopper, 15" in diameter, 24" deep in the powder bed, with an overall height of 33½", and with a maximum width of 20".

In operation the Mark III may be rolled by one man to its point of use. The unit may be used for both fluidizing (dip coating) and spray coating of finely divided polyethylene powders on metal targets. The fluidizing process offers greater flexibility because it can use nylon and fluorocarbons in addition to polyethylene.

Newly Approved CAA Repair Station Specializing in X-Ray Inspection

Approval as a CAA repair station with limited ratings in magnetic particle and fluorescent penetrant inspection and radiographic inspection has been given to Industrial X-Ray, Inc., Long Island, New York.

Radiographic inspection of aircraft has hitherto been confined primarily to production phases by the manufacturers of civil and military aircraft. Upon receipt of the plane by the commercial carrier or private owner, structure parts were examined visually during the regular required service inspections. In addition to being time consuming, this method was inexpensive and limited.

Industrial X-Ray, Inc., described as the largest independent non-destructive testing laboratory on the east coast, has expanded its facilities to accommodate this new operation.

"Our new program encompasses evaluation and analysis of our customers' individual requirements which is headed by a special group of our experienced technical staff," said Mr. Streimer, General Manager at Industrial. "Our new completely mobile X-ray units make this service available at any airport, and you have the added assurance of an approved CAA station certifying each report."

New Listing of CAA-Approved Repairs Stations Now Available

A listing has been prepared to show the name, mailing address and approved ratings of repair stations which have been issued air agency certificates by the CAA as provided for in CAR part 52, and supersedes the listing dated April 1, 1955.

The listing is divided into CAA regions, each region being further divided alphabetically by states. Requests for information relative to CAA approved repair stations should be directed to the Regional Administrator at the address shown at the head of the regional listing.

Foreign repair stations are rated in the same general manner as domestic stations; however, all such ratings are subject to specific limitations imposed by the Administrator.

Limited rating is indicated for repair stations which specialize or which choose to be rated for some particular product or specialized technique. Class type stations usually cover a broader field of activity than a station with a limited rating, since the privileges of such limited rating stations are confined to the product or service for which it is listed.

On-the-Spot Float Repairs

A float repair kit designed to provide the bush operator with a method of making repairs to his equipment with a minimum loss of time is now in production by deHavilland Aircraft of Canada.

One of the most outstanding advantages of this new method is that repairs can be made at the scene of the accident in about two hours, eliminating lengthy and costly delays. The new kit is particularly valuable if damage occurs at a small isolated port-of-call.

This kit may be used to repair damaged sections up to about one-half square foot in area. In general, all repairs will require reinforcing with the aluminum screen supplied with the kit, but some small tears and punctures may be repaired with the patching resin alone. Properly installed, these patches will make floats seaworthy until it is convenient to make permanent repairs. For smaller holes this technique may serve as the permanent repair.

Self-Locking Nylon Fastener is Non-Conductive, Vibration-Proof

A self-locking, self-retaining nylon fastener which facilitates fastenings in blind spots and which provides a method of obtaining additional strong threads in sheet metal has been developed by Tru-Lock Fasteners, Inc., and will be marketed as "Grippit" fasteners.

With the Grippit fastener, a hand or power screw driver and self-tapping screws are all that is required to ensure a positive fastening in blind spots. Grippit is an unthreaded nylon nut which snaps into a square hole in the inner surface of the materials being joined. It has self-retaining features so that it can be inserted during production runs without danger of being dislodged during handling.

A self-tapping screw (type "Z" is recommended) driven into Grippit engages the mating portion and impresses its own threads on the inner surface, as in figure 1. As the screw is tightened the counterboard section of the Grippit is drawn upward and outward, forming a rigid collar behind the lower side of the inner piece of metal, and securely locks it into place (figure 2). The constant grip of the nylon on the threads of the mating screw creates a vibration and shock resistant assembly.

Grippit fasteners are non-conductive, have electronic uses. They are also valuable for assembling enameled parts to avoid chipping and crazing. Presently available to take #8 and #10 self-tapping screws, other sizes of Grippit are to be available in the near future.

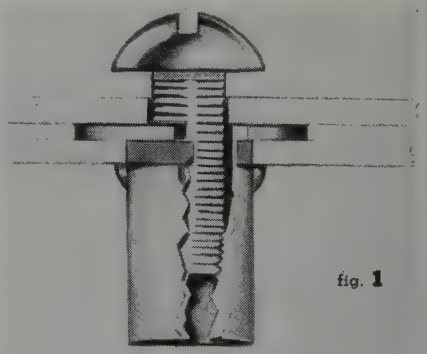

fig. 1

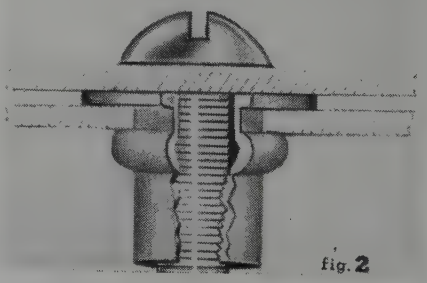

fig. 2

Inventor of CAA "Grid System" Check Receives Flight Safety Award

A Flight Safety Foundation award "for distinguished service in achieving safer utilization of aircraft" was presented last month to Arthur E. Jenks, Chief of Flight Inspection Div., Office of Air Navigation Facilities, CAA.

The award was presented at the FSF 8th annual international air safety seminar, held at Palm Beach Shores, Fla.

Jenks is responsible for the CAA program of flight-checking all the navigation, communications and traffic control facilities on the more than 85,000 miles of Federal airways. Anticipating a brand new set of flight-checking problems in the "jet age," Jenks recently devised a method of using airborne "electronic brains" in the high-altitude patrol aircraft now being acquired by CAA. Complete details on the grid system of navaid checks appeared in *Safety Exchange* of the December SKYWAYS. Current news on the progress made in the new system appears elsewhere in this issue.

During his 16 years with CAA, Jenks participated in the World War II top-secret development of radar, flying 700 test hours over the Atlantic; helped perfect techniques for flying the Instrument Landing System when CAA brought that device into widespread use in 1946; and more recently has contributed to latest developments in the field of runway lighting.

New Portable Hydraulic Floor Crane

A new, low-priced portable hydraulic floor crane which features a sliding extension beam for additional lifting height and adjustable legs which enable the operator to straddle large objects is announced by Stratton Equipmentment Co., Cleveland.

Tested for a variety of mechanical and climatic conditions, the Stratton crane is equipped with a safety release valve which automatically prevents overloading and safety foot-plunger brakes. The sliding beam feature affords 39" of additional lifting length or height, and adjusts to three different positions. The Thrift Model is available in 1-, 2- and 3-ton models.

WEBER *Aircraft Corp.'s Engrg. Dept. has moved into this new building near the main plant, Burbank. The 10,000 square foot air conditioned building, has room for ninety engineers and technicians.*

. . . . in the business hangar

■ Chamberlain Aviation, Akron, recently completed installation of new radio and navigational equipment in the Super Beechcraft E-18 belonging to Mallory-Sharon Titanium Corp., Youngstown, O. In addition to installing a new glare shield type radio control panel, Chamberlain put in a Collins 17L-4/51X communications system, 51R3 navigation receiver, 51Z1 marker beacon receiver, and 51V2 glidescope. They also installed an ARC-15 omni, Dare DTR-360 transceiver, new lightweight Wilcox 701 ADF and a Sperry C-2 gyrosyn system. ☐ The Aero Commander Super 680 owned by the Koppers Co., Pittsburgh, was brought to Chamberlain by Chief Pilot B. Q. VanCott for installation of new radio equipment including dual ARC-15 omni, ARC Type 21 ADF, ARC CD-1 course director, dual DARE DTR-360 VHF system, Wilcox 702 glide slope, Wilcox 700 marker beacon receiver, and a Collins 346 amplifier. Work also included exterior repainting. Kopper also had their DC-3 at Chamberlain for de-icer boot installation and complete radio check.

■ Santa Monica Aviation, Santa Monica, completed installation of a Narco Sapphire model 1016 VHF transceiver in the Texaco Cessna 310. Charles Nicholas is Aviation Representative and pilot for Texaco. ☐ The Aero Commander 560A belonging to Graham Bros., Inc., was completely converted to a Supercharged Model 680 with factory-approved kit and instructions. The change-over was completed in minimum down-time and the results were acclaimed by Pilot Dick Gillespie. S-M's work on the plane also included installation of fuel flow-meters and a Bogen AM-FM hi-fi receiver and company two-way radio-phone system were added. Graham's Cessna 182 left Santa Monica Aviation with a new Dare 22-challen VHF transceiver with omni and localizer units, Lear ADF-14C and custom instrument panel.

■ Aero Corp., Atlanta, was given the contract for recovering control surfaces and making 100-hour inspection of the deHavilland Dove executive operated by L. L. Irwin Parachute Co., Louisville. Irwin pilot is "Mac" McIntosh. ☐ Pilot Ralph Whitworth brought the Coca-Cola Co.'s executive DC-3 from New York to Aero Atlanta for periodic inspection. ☐ Pilot Steve Richards recently flew Magnavox Corp's executive DC-3 from Fort Wayne for X-ray inspection. ☐ Aero Corp. recently made wing inspection of Atlanta-based DC-3 for Barwick Mills.

■ Aero Electronics, Phoenix, has installed Lear L-2 autopilot with approach coupler and altitude control in Southwest Lumber Mills' E-18 Beechcraft, B. Y. Peterson, Chief Pilot. ☐ Lear Arcon was installed in Kitchell-Phillips Const. Co.'s Cessna 182. ☐ Arcon and Lear omnimeter system installed in DeVelco's G-Bonanza, Bud Kingery, Chief Pilot. ☐ Installation of ARC-15D omni was completed in A. Lee Moore's Phoenix-based Beech AT-11.

■ Dallas Aero Service has completed 100-hour inspection, double engine change, propeller overhaul, installation of DAS augmentors, 6BA modifications, new canopy and fabric recover on General Minerals Co.'s deHavilland Dove, piloted by Don Ice. ☐ Ferrell Roberts, Stanolind Oil Co. CP, flew their Dove to DAS for double engine change. ☐ DAS has completed 100-hour inspection and relicensing, and installation of de-icer boots on Republic Natural Gas Co.'s Lodestar, Jim Westbrook, Pilot and Tom Parks, Co-Pilot and Mechanic. ☐ Pilot Bob Ferguson flew Zenith Oil's Aero Commander to DAS from Fort Worth for radio installation, unfeathering system and 75 amp. generator system. ☐ Chuck Forrester, Pilot, and Pete Kilgore, Co-Pilot and Mechanic, have had the J. Ray McDermott Lodestar at DAS for extensive work, including tank reseal, exterior repainting, speed clean up 100-hour inspection, relicensing, rewiring, and installation of complete new interior, Janitrol heater, wing fuel cell bladders, radio, Convair 340 wheels and brakes. The plane is based in Houston.

■ Qualitron, Inc., Burbank, has recently completed a radio installation in the second DC-3 belonging to Aerojet-General Corp., Azusa. Navigation equipment includes custom edgelighted control panels, Collins IFS, dual RMI, 51V-2 glideslope, 51Z-1 marker, dual Bendix MN-62A ADF, and dual Collins 17L-6 transmitters with a 51X receiver for communications. Chief Pilot for Aerojet is Frank Dolinsky. ☐ Don Brady has returned to Calgary in the Lodestar owned by Pacific Petroleum Ltd. after having Qualitron install a new communication and navigation system. VHF communications consist of Collins 17L3 and 17L6 transmitters and a Bendix RA-18C receiver. Navigation facilities include Collins dual VOR with dual RMI, 51Z marker, 51V-2 glideslope, Sperry C4-A gyrosyn compass, and dual Bendix MN62A ADF. The new overhead control panel is edgelighted and contains all electrical switches as well as the radio controls. ☐ A Dare DTR-360 communications system is now being used with excellent results by George Fleming and his Co-Pilot Paul Caribelli in Sears DC-3 based at Burbank. The equipment was installed last month by Qualitron. ☐ Fred Alexander, Pilot for Nevada Gas Corp., Las Vegas, recently brought his company's Twin Bonanza to Burbank for installation by Qualitron of ARC Type 21 ADF. ☐ George Hammond, Santa Barbara, has flown his new 35F Bonanza back home after having Qualitron install the following ARC equipment: Dual 15D VOR with CD-1 course director, new Type 21 ADF, two T-20 20 channel VHF transmitters, F-13 cockpit speaker amplifier, R-20 marker and custom edgelighted control panels.

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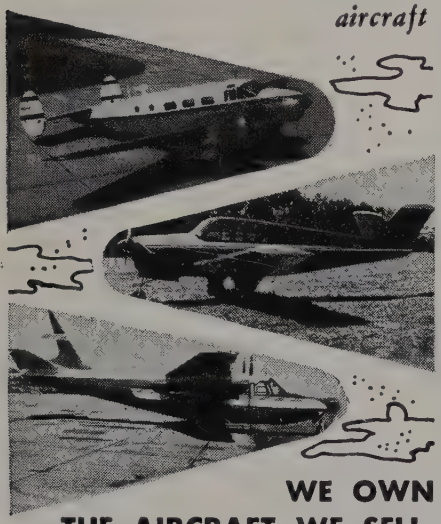

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■ Pacific Airmotive's Burbank Aircraft Div. has Westinghouse Electric's Lodestar flying again after installation of a new custom interior, panoramic windows, retractable dump chute, plus a 100-hour inspection and complete paint job. While the ship was at PAC a complete tank reseal was performed by Aircraft Tank Service, and provision for radar was made by Qualitron. The Lodestar is flown by Chief Pilot A. C. "Curly" Korb.

■ Horton & Horton, Fort Worth, has completed a custom interior in Fletcher Oil & Gas Drilling Co.'s Lodestar which features the company emblem in gold plate mounted on a door of green leather. Paul Wheeler is Pilot; alternate bases for the plane are Dallas, New York and Miami. ☐ The Chicago Tribune's new deHavilland Dove, fitted with black and white tweed, scarlet carpeting and platinum mahogany, was flown from Fort Worth by Parker Berge and Harold Erwin.

■ Bayaire Avionics, Oakland, was host to the Lodestar piloted by Dick Cull for California Standard Co., Alberta, Can. Collins 51X-1 was installed, and miscellaneous servicing completed. ☐ Hancock Electronics' Riley Twin, Pilot Ken McDonald, visited Bayaire for installation of ARC 15D, Narco VC-27 and Omni, Flite-Tronics MB-3 and CA-1, and Lear ADF-12.

■ Southwest Airmotive, Dallas, completed 100-hour inspection of R. H. Fulton's D18S Beech, Pilot Slick Slaughter. ☐ Pilot R. C. Little brought Sohio Petroleum Co.'s D18S in for 100-hour inspection. ☐ Pilot W. R. (Bill) Pruner and Co-Pilot Philip Kaufeld brought Cummins Engine's DC-3 to Southwest for short stack installation and double engine change.

■ Grand Central Aircraft Co., Glendale, has just completed 100-hour inspection, the installation of Hamilton Standard propellers and major structural rework on the Pacific Automation Products' Twin Beechcraft, Ray Cote, Chief Pilot.

■ Lear Aircraft Engineering Div., Santa Monica, announces the delivery of an 11-place Learstar Mark I to NBAA member American Cyanamid Co., William Shaughnessy, Chief Pilot. Cyanamid Learstar, 20th to enter service, started immediately on a 1100-mile business trip.

■ AiResearch Aviation Service Div. of Garrett Corp., Los Angeles International Airport, is making a double engine change of Pratt & Whitney 1830-94's on the DC-3 operated by Reynolds Metals, Richmond Div. The DC-3 was brought in by Pilot Bill Holtz and Co-Pilot Jerry Weaver. It is also undergoing installation of a large outside loading baggage door, installation of RCA AVQ-10 radar system, and partial modification of the interior.

■ Walter Westerfield has had an A.R.C. Type 21 lightweight ADF installed in his General Insuror's Aero Commander.

■ Dow Chemical Co. now has Bendix X-Band radar installed in all three of their DC3.

■ The Owens-Illinois Glass Company twin Beechcraft at Toledo for conversion into a Custom 18, with enlarged cabin, big picture windows, new interior, Narco Sapphire 1016 360-560 channel VHF transmitter Receiver, A.R.C. Type 21 lightweight ADF, Sperry H5 electric gyro horizon, Eclipse electric turn and bank, and Weather Eye X-Band lightweight radar.

■ Van's Air Service, Winona, Minn., has just completed radio work and installation of Gyracin Compass in Geddings-Lewis Co.'s Lodestar, Doug Lionberger, CP. ☐ Radio work was also completed on the DC-3 and Cessna 310 owned by NBAA member J. R. Watkins Co., and on the Aero Commander owned by Marathon.

■ Skymotive, Inc., O'Hare Field, Chicago, has just completed the installation of a Safety Performance Kit on Crane Co.'s D18S. Skymotive has previously installed Panoramic windows and a complete new interior for Crane.

■ Dallas Airmotive, Dallas, was host to Joseph W. Clemow, Eastman Kodak Chief Pilot, relative to their Engine Overhaul Program. ☐ G. T. Culpepper and M. P. Dow, Pilots for Texas Illinois Pipeline Co. visited Dallas Airmotive for overhaul of P&W R-2000 engines on their DC-3.

■ Southwestern Skyways, Inc., Santa Fe Lear distributor, recently completed installation of L-2 autopilot with automatic altitude controller, approach coupler and LVTR-36 transceiver in the Cessna 310 owned by Arturo P. Ramos, Santa Fe. Tony Cummings is Pilot. ☐ L-2 autopilot was installed in L. E. Meyer Co.'s Bonanza. ☐ LRTA-6 with omni system and ADF-12 were installed in the Cessna 182 owned by Lewis W. Lothman, Albuquerque. ☐ Southwest Skyways installed Lear ADF-14D in the Cessna 310 owned by Ambrosia Minerals, Albuquerque. Bill McKeel is Pilot.

■ W. R. Crow, Inc., Lear distributor at Toledo Municipal, installed LTRA-6, ADF-12 and LVTR-36 in the 1957 Piper Apache owned by Paul T. Bailey Co., Toledo. ☐ LTRA-6 was also installed in the Piper Tri-Pacer owend by Bluffton Flying Service, Bluffton, Ohio. Dottie Anderson is Pilot.

■ Remmert-Werner, St. Louis, has completed a double engine change on the Chemstrand Lodestar, Bob Hinds, pilot. ☐ Pickands-Mather DC-3 has had a Collins airborne radar installed at R-W Toledo, with hinged radome, swingaway scanner. Art Zimmer is pilot.

■ Remmert-Werner, Pompano Beach, Fla.: Bill Poag brought the Massey-Harris Lodestar for installation of an Edison fire detector system; Paul Runcan had The Green Construction Company Lodestar for installation of R1820-72 engines; Wes MacIntosh brought the Eastern Canadian Stevedore's Super-92 DC3 for installation of two new Engine Works Super-92 engines.

■ Vic Swanson and Lloyd Miller brought the Sears-Roebuck DC3 for installation of two R1830-94 engines and modification of their radar antenna system.

■ Ralph Piper has had a Collins 17L6-51X VHF communications system installed in Monsanto Chemical Company's DC3 Prairie Wings.

■ California Aviation Service, Oakland Lear distributor, has installed L-2 equipment in the Beech D-18 owned by Oregon Steel Mills, Larry Hill, Pilot. ☐ L-2 also installed in the Aero Commander owned by U. S. Plywood, Chuck Holcombe, Pilot.

■ Southern Airways Co., Atlanta Lear distributor, recently completed installation of Lear LTRA-6 DM in Bonanza owned by Huffman-Wolf Co., Pilot, Hal Morris. ☐ LTRA-6 DM also being installed in Conway Construction Co.'s Bonanza.

safety exchange

A clearinghouse of practical information on recent developments affecting flight safety. This will include Performance Pitfalls, factual accounts and analyses of actual, in-flight occurrences (near misses, unusual in-flight experiences, conflicting traffic clearances, and other incidents of non-routine nature. In addition, CAA, CAB reports and other sources will be briefed.

Ralph Piper, Chief Pilot, Monsanto Chemical Co., St. Louis, is NBAA coordinator of the Safety Exchange. Readers are urged to advise Mr. Piper of all ideas which may contribute to the safety of business aviation. Address him c/o SKYWAYS for Business, 122 East 42nd Street, New York 17.

CAA To Test Runway Lights

CAA will test three experimental runway lighting systems at Andrews AFB, Md., within the next few months in preparation for the civil jet age.

Pilots have long complained that runway illumination is the weak link in night flying. After high intensity lights have guided them to the end of the runway, the pilots report, the surface itself appears as a "black pit." Conventional lights along the edge of the runway fail to show clearly how high the aircraft is above the runway.

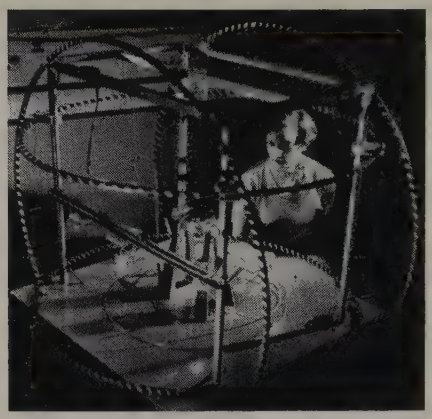
"Thanks to cooperation from the Air Force, the air lines and their pilots, and the users of business aircraft," said James T. Pyle, Acting Administrator, "we expect to come up with some definite U.S. civil-military standards for improved runway lighting by next March. Also, we expect to present a U.S. proposal for world standards to the I.C.A.O.

The three systems to be flight tested at Andrews attempt to eliminate the "black pit" effect by putting illumination on the runway itself.

Two of the systems involve high intensity lights buried in the runway itself, protected from wheel impact by a set of steel bars or a cast iron hood. These two installations, which differ in their optical characteristics, are arranged to appear to the pilot as short bars of light.

The third system illuminates the runway surface from its sides with newly developed high-power fluorescent tubes mounted in front of reflectors along the edge of the runway. An experimental checkerboard of reflecting paint, already in place on a runway at Andrews, is expected to improve the efficiency of the edge-lighting system

NBAA Director William K. Lawton will participate in the tests with CAA. He will be a member of the team reporting on the system best suited to the needs of business aviation.



FLIGHT TRAINING FOR INSTRUMENTS. *This General Electric test device simulates the banking, pitching and turning of an aircraft, as well as duplicating the magnetic field of any point of the compass, in order to test the reliability of aerial navigation aids. The operator is testing part of an aviation compass system. She has set a magnetic field for a place near the North Pole, and is now checking performance of the compass transmitter against a master as the "aircraft" makes a complete turn.*

Business Pilots Safety Record Cited By Safety Director

"In contrast to private pleasure flyers," stated Mr. Jerome Lederer, Director of the Cornell-Guggenheim Aviation Safety Center, "most business flyers have a considerably larger investment in their aircraft and tend to have more thorough instruction in flight procedures. Thus, this class of flyer has rolled up a considerably better record than the so-called 'week-end' pilot."

He goes on to point out that whereas private pleasure flyers had a record of approximately one fatal accident per million miles flown in 1954, private business flyers averaged only about one fatal accident per 15 million miles. The final accident rate figures for both classes are expected to show substantial improvement for 1955 and 1956.

The Aviation Safety Center pointed out that according to the CAA there were 200 fatal accidents to private pleasure craft in 1954, a number that was reduced to 190 in 1955; however, private pleasure flyers logged approximately 210 million miles in 1954 against about 222 million miles in 1955. Thus 1955 saw about a 10% increase in "exposure" (mileage flown) but a 5% decrease in the fatal accident rate. This year, Mr. Lederer said, will probably see a greater increase in the mileage flown by all classes of flyers.

The basic cause of fatal accidents in private pleasure flying, said the Center, is the lack of airmanship on the part of private flyers. Many private flyers do not have the skill or training to handle themselves and their aircraft under adverse conditions, how to avoid hazardous conditions or to get out of them when they do arise.

To help remedy this situation, the Center has suggested that private pleasure flyers get training in Link simulators. Another proposal is that flight instruction be improved and standardized throughout the country.

Since most private pleasure craft contain only basic instruments, the Center noted, installation of more flight and navigational instruments and adequate training in their use should materially reduce the accident rate.

(Ed. note: We would like to add to Mr. Lederer's observations that the comparative records might also reflect the more serious and responsible approach taken to flying by business pilots flying even the same equipment as "pleasure" pilots. The extraordinary safety record of business pilots demonstrated by the NBAA safety awards published in the December issue of SKYWAYS is conclusive proof of this. When your safe arrival at destination is a matter of economics as much as personal safety, the personal business pilot responds with better preparation, better skill and judgment.)

Engine Fires in Multi-Engine Planes

Some facts on powerplant fire protection of interest to business aircraft owners have been excerpted from the September 1956 CAB Annual Review by Flight Safety Foundation. The fire protection study, which appeared on page 52 of the Review, covered all in-flight and ground fires occurring in multi-engine aircraft under 12,500 pounds with engines less than 1000 cubic inches displacement between 1950 and mid-1955.

In this period it is reported that a total of 51 fires occurred, of which 34 (64%) occurred in flight. Ten fires involved supercharged engines, and 41 unsupercharged. Fires were not limited to any single horsepower or displacement category, occurring as frequently with single 65-hp engines as with 500-hp.

Based on 1952 and 1954 figures, 3% of all accidents and malfunctions involving engines and engine installation difficulties resulted in fire.

Fuel systems accounted for 49% of engine fire causes, and 56% of fuel system difficulties lay in the fuel lines. Engine failures represented 14%; 6% were exhaust system, and 31% of the causes were undetermined.

Copies of the CAB Annual Review, dated September 1956, are available from CAB, Washington 25, D. C.

Analysis of 600 Icing Encounters Over North America

With winter approaching, executive pilots may be interested in knowing that, as a result of the analysis of over 600 icing encounters by airlines and military aircraft during a recent winter, the following facts were evolved:

1. 50 per cent of the icing conditions were intermittent.

2. 90 per cent extended over a distance less than 120 miles.

3. 90 per cent of unbroken icing conditions extended less than 50 miles.

4. 90 per cent of vertical icing cloud traverses were less than 4500 feet.

5. 93 per cent of the ice accumulations would have been two inches or less in thickness.

6. 90 per cent of the temperatures in icing were above minus 15°C. (plus 5°F.)

7. Greatest observed potential ice accumulation (without removal) was 6 inches; longest flight in icing conditions was over 400 miles.

Courtesy of Flight Safety, Inc.
LaGuardia Field, New York

Operations Tips from ALPA

Two short items which are very much worth repeating are reproduced below from *Technical Talk for Pilots:*

"Chicago Midway Airport presents a problem to aircraft performing pre-takeoff engine checks. Please carefully position your airplane heading towards the fence and parallel to the runways so your prop blast does not blow across the runway to disturb other airplanes landing or taking off."

"Don't use your wing illumination lights to make your airplane conspicuous. A bright white light shining out of the side of your airplane is too easily confused with a landing light pointed dead ahead and it also obscures your colored wing tip light. Other pilots and control tower operators misinterpret your signal when you display wing illumination lights instead of landing lights—near misses can result."

Flight Safety Checklist Tells You When You Need Oxygen

Flight Safety Foundation has listed human requirements and performance limitations at altitudes up to 50,000 feet. Faster and more capable business planes make some of this information relevant to business flying, and the requirements are listed below for altitudes up to 25,000 feet.

5000 feet—Maximum for normal night vision without supplemental oxygen

8000 feet—Altitude at which supplemental oxygen should be used for routine flights

10,000 feet—Maximum without routine use of oxygen

18,000 feet—Maximum for emergency use without oxygen

20,000 feet—Altitude at which consideration should be given to the use of pressurized cabins

23,000 feet—Altitude at which there is evidence of depressurization sickness

25,000 feet—Approximate time of consciousness without oxygen is 116 seconds.

CAA's First New Flight Check Plane, Expected in 1957, Now Available

The Civil Aeronautics Administration has been able to obtain immediate delivery of the first of five aircraft for flight check work, thanks to an assist from the Air Force.

The plane, a C-131E cargo version of the pressurized Convair 440, was one of a larger order placed by the Air Materiel Command, CAA's five aircraft were scheduled for delivery in the fall of 1957.

The Air Materiel Command, however, gave CAA one of the first planes off the line so it could train its pilots and have a year's operational experience with the new type aircraft. CAA will get the other four planes within a year.

The five Convairs being purchased by CAA will be used in flight checking the air navigation aids at intermediate altitudes between 10,000 and 20,000 feet. The existing CAA flight inspection aircraft, which are not pressurized, check the facilities along the airways up to about 10,000 feet.

The five flight-check Convairs will have floors stressed for heavier loads than required for passenger service, special electrical generating equipment, and cargo doors.

SAC

Silver Jubilee Newsreel

THE 20's THE LEAN YEARS

AFTER WW 1, LOVE FIELD FOR A TIME BECAME WINTER QUARTERS FOR A CIRCUS.

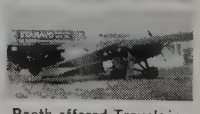
SURPLUS JUNK JENNIES WERE BURNED NEAR OLD HANGAR ROW.

HUNGRY BARNSTORMERS WOULD DO ALMOST ANYTHING FOR A BOWL OF CHILI.

DOC BOOTH—WEST POINTER AND EX-ARMY PILOT—FORESAW SUPER SERVICE FOR OILMEN'S PRIVATE PLANES.

1932 A DREAM TAKES SHAPE

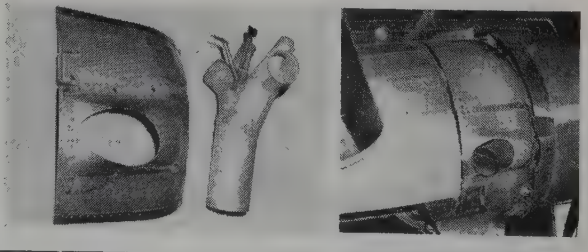
So—aided and abetted by Oilman-Rancher Charles Pettit—Doc Booth (top right photo) in 1932 opened the doors of old Hanger 1 to mark the start of the company now known as Southwest Airmotive. (Fast, sleek Lockheed Orion in foreground.)



Booth offered Travelair ambulance plane service.

1957 STILL PIONEERING

A BETTER DC-3 SHORT STACK INSTALLATION—Saves 44 lbs. wt., improves performance, cheaper to maintain, long-lived, attractive. Left: Modified cowling and exhaust stack (note brace). Right: Complete job, with reskinning. Write Service Sales Mgr. for details, package price.



1932 A QUARTER CENTURY OF LEADERSHIP 1957

Southwest Airmotive Co.

LOVE FIELD DALLAS

DIVISIONS: KANSAS CITY, KANSAS / DENVER, COLORADO

Loose Snow and Reversed Props Produce No-Visibility Landing

Winter flying sets up all sorts of unexpected problems, even for people who perhaps should have expected them. Flight Safety Foundation's Accident Prevention Bulletin 56-21 describes a situation created by the use of fair-weather techniques in such a way as to aggravate an already marginal situation.

The accident occurred to an air transport when blowing snow, churned to a curtain by the propellers, blocked out all visibility during a landing.

"Upon touchdown the co-pilot raised the reverse thrust lockout flag, permitting prop reversal before the plane's weight was on its wheels, and the captain used reverse thrust beyond the normal reverse range and into the emergency reverse range. Forward visibility was completely obliterated by surface snow blown forward and up by the reverse thrust. Noting a slight change in the heading on the Flux Gate compass, the captain reduced rpm in order to see where he was headed.

"He then applied right rudder and right brake and increased the reverse thrust, bringing the aircraft to a course approximately paralleling the runway. Again blowing snow blocked visibility and again the pilot reduced power to regain it. When he realized he was turning away from the runway, he applied right rudder and brake to change direction. Near the end of the runway the captain once more applied maximum reverse and for the third time lost all forward visibility."

Flight Safety reports that at the end of these maneuvers the transport was resting on a ledge about 186 feet beyond the end of the runway and about 60 feet below runway level. The ground sloped downward at about 28°, the plane stood nose-down about 40° and was turned 15° to the right. Although the passengers and crew were uninjured, extensive damage was done to the engine nose sections, propellers, lower fuselage and landing gear.

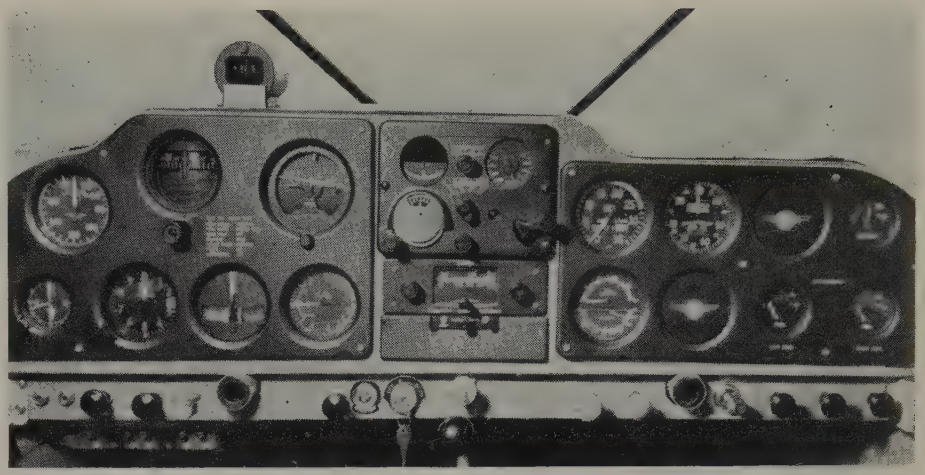
FSF recommends, "When getting weather information from the tower at your landing airport, include the possibility of snow kicked up by the props. And remember that your landing run on a slippery runway is considerably longer than on a dry runway, and brakes won't be of much help. Also, no matter what your minimums are, if you cannot see the horizon when you go from IFR to VFR and level out, the safety of your flight is jeopardized. As a safeguard, employ higher minimums and better visibility during winter operations."

Accidental Priming of Engines Causes Stall in Landing

An incident reported by Flight Safety Foundation from ALPA's Technical Talks for Pilots is worth repeating:

"During the early stages of the landing roll, both engines of a twin-engine transport stopped. However, the landing roll was completed without incident. Upon investigation of the nacelle area, gasoline was found dripping to the ground. Further investigation disclosed that the primer switches and the cowl flap switches were in close proximity to one another, and during the landing roll the primer switches inadvertently had been actuated instead of the cowl switches. This resulted in too rich a fuel mixture and the subsequent engine stoppage.

"To prevent the re-occurrence, the operator has installed guards so that the primer switches cannot be operated inadvertently. It would be well to study the location of your aircraft primer switches to make certain such inadvertent actuation does not happen to you."



INSTRUMENT PANEL *of the Piper Tri-Pacer 150 reflects the need of the increasing number of personal business pilots for full instrumentation and functional grouping. In accordance with CAA recommendation, all flight instruments are grouped directly in front of the pilot at the left. Radios are in the center, and engine instruments are at the right. The dual fuel-tank indicators at right may be combined in a single selector type gauge, and the resulting space used for a vacuum gauge for the engine-driven vacuum pump. The other two larger openings can be used as the owner prefers for an emergency battery radio, dual VHF omni or communications receiver.*

Controller Cited For Error Resulting In Near-Collision

On October 18, 1956 an executive aircraft enroute Nashville to Atlanta via Victor 5 airway at assigned altitude of 7000 ft reported over the Chattanooga Omni within one minute of an airline Martin enroute Greenville to Chattanooga via Victor 54 at the same assigned altitude.

Inbound information pertaining to the airline flight including route, estimate and altitude had been forwarded to CHA Approach Control by the Atlanta Center controller and the flight released to Approach Control at 0940. Instructions were given to Approach Control to descend the aircraft out of 7000 at Crandall intersection (17 mi. east of CHA) with the executive flight as pertinent traffic information. However, the Center controller failed to instruct the airline flight to contact CHA Approach Control ten minutes ahead of estimated time over CHA for terminal area clearance, a standard procedure. (Arriving aircraft are not released to Approach Control until the Center has provided separation from other enroute traffic).

The investigation report points out that the airline flight should have been cleared to Crandall intersection only, to descend in the Crandall holding pattern to 6000 ft and then contact CHA Approach Control for further clearance.

The report describes the Center controller concerned as a both experienced and capable controller with a good record of over 10 years service in the ATL Center. The seriousness of the incident nevertheless warranted that disciplinary action be taken.

Pandora's Purse

The contents of a woman's handbag can be a wonderful . . . and a terrible thing! A recent report from a safety engineer states the case:

"One evening a commercial air transport pulled away from the terminal building and taxied to the end of the runway for a take-off. As the engines were being run up, a commotion started in the passenger compartment. At the cry of 'fire' the Captain rushed back to investigate. Noticing smoke pouring from under a seat, he reached down, pulled out a lady's burning purse and threw it out of the aircraft. The transport then was taxied back to the gate and an airport police cruiser was dispatched to retrieve the burning handbag.

"The bag contained tissues, handkerchiefs, a can of hair spray, half a dozen books of matches, baby's diapers, several baby bottles, an automatic combination cigarette case and lighter and $350 in cash.

"The lighter was operated by pressing a button on its side which caused it to open and light automatically. When it was pulled from the bag it was found in the open position and well blackened. It was surmised that one of the baby bottles had hit the button, causing the lighter to fly open and ignite.

"The empty burned purse was left with the airport police and the lighter was entrusted to the stewardess until final destination was reached."

nu-avi-quip

Color-Coded Gaskets/Shims Are Self-Sealing

A new plastic gasket and shim stock, color-coded to indicate the twelve different thicknesses that it comes in, has been introduced by General Gasket Company, Industrial Road, Clifton, N. J. It is being marketed under the name of Color-Plast Gasket and Shim Stock.

Each gauge of the new material is identified by its own distinctive color, making selection of the correct gauge almost automatic. It is ideal for both shims and gaskets as it holds its gauge to micrometer tolerances. It is impervious to oils and greases even when they are boiling hot, will not swell or become distorted after long use. The resiliency of Color-Plast makes the use of gasket cement unnecessary. In certain applications it may replace three thicknesses of other materials, since it serves as shim, gasket and sealer.

Color-Plast is easily cut with hand tools, and is finding wide application in the aircraft, marine, and hydraulic industries.

New Helicopter Rotor Lubricant

A new lubricant, designed especially for the main rotor and tail rotor assemblies of helicopters, has been developed by Shell Oil Co.

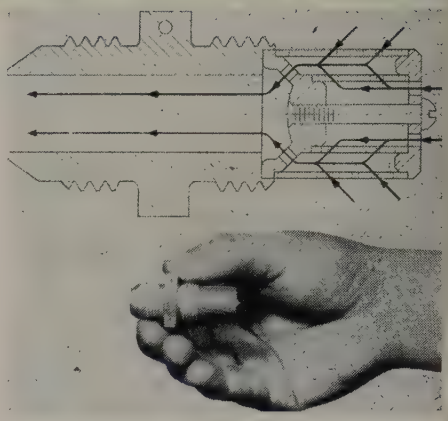
Called Aeroshell 14, the new grease minimizes fretting corrosion and prevents corrosion of bearings due to the presence of moisture. It flows well at low temperatures, and extends the cold weather operating range to —65° F.

The new lubricant is recommended by Sikorsky for all its helicopters.

New Landing Lights for Piper Apache

In response to the landing light problem which has confronted owners of the Piper Apache, Dallas Aero Service has designed a new type landing light installation, recessed in the leading edge of each wing, which has received CAA approval.

The new recessed lights are said to be the most efficient ever developed for the Apache. Each light is 100 watts, and is focussed for 300-400 feet distance from the ship. The installation weighs 3½ pounds. It has received a supplemental type certificate.



NEW UNION-FILTER VALVE PROTECTOR *inhibits damage to aircraft hydraulic systems by filtering out all particles from hydraulic fluids down to .003 inches in size. The unit employs nested filters (see diagram) to provide additional filtering area and reduce pressure losses. The Union-Filter is made by Purolator Products.*

Air-Portable Executive Dictating Machine

"Voice correspondence" is the descriptive title of a practical new method of dictating letters or notes on flexible plastic discs which are easily mailed in a standard envelope. The Sound-Scriber Corporation of New Haven, Conn., has unveiled a revolutionary new SoundScriber "200" portable dictating and recording instrument. It is the smallest, lightest, and most compact of its type yet perfected by a manufacturer.

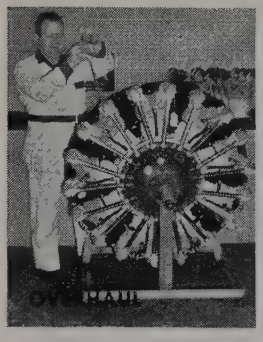
Weighing only 6 pounds, this latest development in modern disc dictation weighs 2½ to 8 pounds less than any dictating machine available. The "200" measures 2⅞" x 6¼" x 10".

Another feature that makes the Sound-Scriber "voice correspondence" system so practical is that the plastic green disc can be played back on a *standard 33⅓ rpm record player* in office or plant. Technical aerial survey reports can thus be made "on the spot" for engineering analysis at home bases. Obviously, business dictation for later office transcription is more practical than previous methods for airborne use.

"The miniaturization of a dictating machine to the size and weight of the '200' still offering the convenience and function of a standard office machine, we feel, is truly a miracle of modern electronic engineering," SoundScriber President Joseph H. Hoyt claims. "The new '200' has been developed in direct answer to the demands of America's business executives for a really portable dictating instrument. The Sound-Scriber '200' offers the traveling busi-

BUSINESS PLANE SERVICE

Whatever your requirement— You'll find it at Ohio Aviation.



Keeping a plane in service is something like maintaining your health—It occasionally requires the services of a specialist. Here at Ohio Aviation services such as conversion, radio installation, instrumentation, engine overhaul, upholstering and refinishing are being given to a large number of corporation owned aircraft. A large stock of spare parts results in quick service that cuts down the loss in flying time. Many corporations have selected Ohio Aviation to keep their planes in top operating condition on a year—round basis. Why not join the list of large corporations who use Ohio Aviation service consistently. See us on your next service requirement. Call Vandalia 4-4646.

THE OHIO AVIATION CO.
Dayton Municipal Airport,
Vandalia, Ohio

nessman or woman the convenience of an office dictating machine while on business trips or when at home," Mr. Hoyt explained. He goes on to explain that busy executives on the road or in the air can expedite reports and correspondence back to the home office by dictating and mailing their discs, rather than typing their own letters or having a public secretary type them.

When a salesman completes a call on a customer or prospect, he can dictate any correspondence or reports in car or airplane while everything is fresh in his mind, or when he gets back to his hotel room. SoundScriber claims that an extra sales call a day can be made by salesmen using this practical system because they don't have to stop calling on customers early to type up reports and letters. With the use of an inverter, the '200' can be plugged into a cigarette lighter of an automobile or airplane. When not in use, the handy instrument can be placed in the glove compartment, safely stored.

As in all previous SoundScriber equipment, indexing is accomplished on the disc rather than on a paper strip. The SoundScriber '200' records on the SoundScriber 3" Memo disc, holding eight minutes of dictation, and the 3⅞" Mail-Chute disc, holding fifteen minutes of dictation. Either disc is easily mailed in regular business envelopes for only 3¢ postage. Microphone, power cord and a supply of discs are all self-contained within the compact unit.

Ropelock Eliminates Knots In Cargo Tie-Down Equipment

Elimination of the tieing and untieing of troublesome rope knots in cargo tie-down and other applications is now a reality with new Aeroquip ROPE-

LOCK of Jackson, Mich. The Ropelock is designed for use with either ⅜" manila or ⅜" nylon rope. Its simplicity provides a quick, easy method of securing almost any type of load.

Tension on the Aeroquip Ropelock is automatically locked at whatever maximum pull is exerted—there can be no slackening or backlash. The load can be instantly released by pressing down on the cam, the only moving part. No springs or artificial mechanisms are used in the Ropelock as the force exerted by the rope sets the cam. Strengths of 1000 lbs. with nylon or 700 lbs. with manila rope are obtainable with the Ropelock, which retails for less than one dollar.

PORTABLE X-RAY UNIT. *A 130 kv portable X-ray with tube head weighing only 50 pounds and capable of penetrating up to 1¼ inches of steel is announced by Andrex, a pioneer in the field. Tube head measures only 7½ x 18 inches and operates on simplified lightweight control units of its own, or on a standard Andrex 160 kv control. New unit is especially useful for spot X-ray of welds.*

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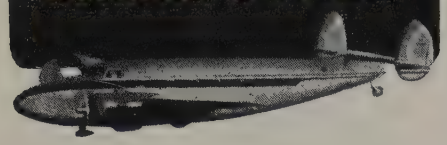

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WRITE FOR LITERATURE

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ATC Panel

(*Continued from page* 22)

have to start our descent at about 150 miles or from destination."

Morrow: "It is very interesting, I think, to get the other extreme of this problem to temper our sense of proportion a little bit and to realize the amount of air space required to carry out some of these maneuvers.

"Also, I believe you mentioned the Stewart Air Force Base. I believe it is on the New York, Chicago airways. Now, tell us what some of your problems are there.

"I notice that some of our people have delays or diversions around there.

Major Sadek: "Perhaps I had better explain that. Very briefly, our Air Defense operation is divided into three major categories: Air Defense missions, training missions and missions concerned with exercises.

"Now, in the Air Defense missions, it occurs when a radar controller is unable to correlate flight plan information with his target. This means that he orders a 'scramble.'

"From the time that the scramble order is given until the time the pilot becomes airborne should be less than five minutes. That means that he has got to get spontaneous clearance for him to get airborne and climb up to these high altitudes already mentioned and get him up into the target area.

"In doing this and in getting to his target, he burns a considerable amount of fuel. For instance, even in some of the older aircraft, such as the F-94B of several years ago—I distinctly recall that on take-off we burned about forty-seven gallons a minute, so you will see it doesn't take very long to run your fuel out, when you are wide open, trying to get to a target.

"This means that by the time you get to the target you are already an emergency so coming back, you can't proceed to a fix, go through a lot of traffic holdings and as a matter of fact, the situation becomes critical as to the *direction you are pointing* when you are given your clearance to descend.

"If you are headed away from your penetration patterns, it takes you about three or four minutes to complete a turn and get back. So these are the problems we have to live with.

"In some operations, there are really no provisions made for us to operate, that is leave a base right through a stream of traffic and come back down through that same stream of traffic.

"The duration of the flight is so short that the aircraft control people have a great deal of difficulty in doing any planning for us. This is one of the reasons, in attempting to assist the Air Defense mission, the air traffic control people will probably give some rather strange clearances on occasion."

Morrow: "I just want to add one other comment. I think that it should be apparent right now that the traffic control problem has developed into an extremely wide range of requirements.

"Max talks about this requirement of navigating at a speed of 100 miles an hour or even slower than that. Major Sadek has been talking about the traffic control problems involving aircraft unable to hold at speeds of less than 250 or 275 knots. We have rates of climb in some jet aircraft so small that you can hardly tell it, to 20,000 feet per minute.

"The traffic control problem is so broad that I want to try to lead us in the time that we have into some of the things that have been given to me as problems. One of those is, 'What kind of hardware have we got now'? And, 'What kind of hardware are we going to have'? 'Who is doing something about traffic control development'?"

Hilton: "We recognize that there very definitely is a requirement for positive control of all aircraft movements in certain air space, but that is not something that will be achieved within the three year figure limitation that has been imposed on this construction.

"However, I would like to point out that in our longer term planning, we are looking forward to the day when, at least at the altitudes at which the jet aircraft will normally operate, we will be able positively to control and separate all aircraft flying in this air space. But this is going to take a lot of doing.

"It may take equipment that is not yet completely developed. We are going to make a stab at it through our expanded radar program. The CAA Director of Air Traffic Control recently participated in flights with the Boeing 707, and brought back a reconfirmation of the fact at jet aircraft speeds at altitude, you just don't see traffic clearly."

Morrow: "It has been my experience, at the jet instructor school in Georgia, that at jet speed, possibly at low altitude, you don't see half as much as you ought to see. It just is beyond the physical capabilities of the healthiest human being to expect a jet pilot to see small aircraft or any other thing in the air.

"So that we may argue about what's required but when you are flying out there in your little, old slow DC-3, with its souped up maximizer kits and everything else, going every bit of two hundred miles an hour, you are just barely moving along when some of these aeroplanes will be passing you. We are all going to have to find out a way that we can all live in the sky because I know, from my own personal experiences, that you cannot expect these people to do it all by themselves.

"The next question is: How are we going to run for the next three years with the hardware we are going to have?

"Everybody starts waving his hand on that one, so, Bill Bouder."

Bouder: "We all recognize the fact that communications is a big problem in air traffic control. We know what can be done within the next three years and so on, but what can be done now?

"If the pilots we have here with us today will indicate by raising their hands if they think we should have an enroute frequency other than 126.7, I will appreciate it."

Morrow: "Everybody in favor of it raise his hand."

Bouder: "If we can have some of the panel express an opinion on that I would appreciate it."

Morrow: "Jack, will you or Norm answer that question?"

Hilton: "At the moment, as some of you may be aware, we are putting in a rather extensive system of what we call peripheral communications facilities to give the pilot the capability of talking directly to the controller at the Center.

"As Norm Beuter pointed out a few moments ago, probably the most complete installation of this kind now exists in the New York Center area and the plan is to divide this up on a sector and a route basis, so that each controller who has business with an aircraft in his sector or along the segments of the route, will have a discreet VHF frequency to talk to the pilot on. This is going to do a great deal for the pilots who are so equipped.

"Of course, the man who has limited communications equipment is probably going to be stuck with a common enroute frequency operation. To the extent that the better equipped aircraft get off of the common frequency on to the discreet frequency that is set up for this particular area, it will tend to relieve this problem."

Bouder: "When is this going to take place?"

Hilton: "Well, as far as the New York area goes today, I think it is just about 100% equipment added to your re-

(*Continued on page* 40)

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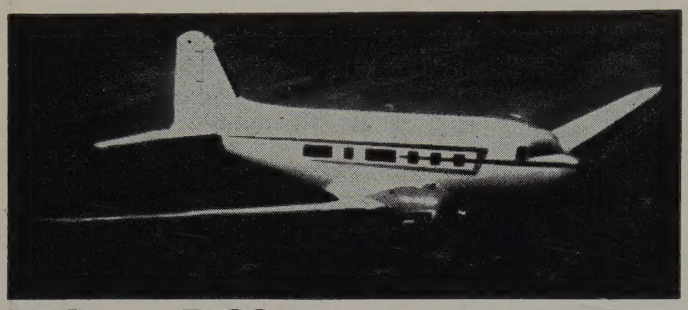

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ATC Panel

(*Continued from page* 36)

quirements today. Isn't it, Norm?"

Beuter: "Not quite 100%, but we do have the coverage surrounding the area with a sufficient number of frequencies.

"Currently there are three more remote sites going in with about thirteen additional frequencies. I don't believe that quite answers your problem.

"Are you mainly referring to the VFR operation?"

Bouder: "My question was actually on frequencies, which is all air traffic control frequencies in use and available in the transportation system.

"While operating in a highly complicated area, it is absolutely necessary that we should have them available; and that means everything starting at 118 up to 125 mc.

"We have 180 channels and it should take care of us very well but I am speaking of this out of the way place down the line, not New York; one of the stations where you have got about seventeen people on 126.7 mc and all of them are trying to get clearances at the same time."

Member of the Audience: "122.2 mc is not being used nearly as much as it should and we have found that by using 122.2 mc we get a lot more action than by using 126.7 mc."

Morrow: "We are running out of time, but there are two points that I want to cover. While using airborne radar, you sometimes get clearances which if you carried out that clearance on this particular airway and you kept the needle centered, it would run you right into a thunderstorm.

"With airborne radar you may be tempted to head for the shelter spots and there would be a lot of other people heading for the same sheltered spots, so that one of the problems that has to be worked out is before you do that, you had better make sure that there isn't somebody else heading for the same thin spot in the clouds.

"The next point which we didn't get around to discussing and which I think is essential, the announcement has been made by the C.A.A. of a $275,000,000.00 program, of which $75,000,000.00 is underway right now—and most of that evolves around radar—I am sure most of you want to know how to make the best use of your aeroplane in radar traffic control.

"And that just leads now into the matter of beacons. I would just like to say now to be careful of purchasing any radar beacon before you determine that it is the beacon that is going to be used.

"Now in summing up, it seems that we can in the meantime, among ourselves, improve things by trying to improve our communications technique and improve communications time.

"We are probably going to have to get along with our hardware, just about what you have, as far as we can see right now.

"Some of the things that do not involve development and implementation programs, should be investigated and instituted by the C.A.A. since it is their statutory responsibility to carry on the development and implementation work and to lay down the rules and regulations.

"One of the things that disturbs me a great deal is to see everybody else getting in the act. I think that N.B.A.A. has been criticized in certain quarters because we don't carry the technical ball that belongs to C.A.A. We think that it is wrong for any organization to pick up this ball and carry it because all you do is to confuse the issue.

"Now, I sincerely believe that what we should do is to get behind the C.A.A. as they are the agency that has to carry out the statutory job. Support them; get all of your Congressmen and say, 'Why don't you appropriate them the money so that they can do the job'? And then you'll camp on C.A.A. to see that, having the tools, they use them.

"I commend to you to cooperate with some of the field investigation work that is required to get the numbers by which some of our problems can be solved. Let's don't automatically appose C.A.A. or whoever is assigned to do the job. I think that's the way we ought to do it. I don't think it is up to N.B.A.A. to be trying to develop traffic control techniques or devices. I think it is up to us to cooperate to our fullest extent with those agencies that have been given that job." +++

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